AV AUDIO VISUAL COMMUNICATION REVIEW

Joseph H. Kanner
Richard P. Runyon
Otello Desiderato
Television as a Training and Educational Medium

John Mercer
Sam Becker
The Disenchantments of Educational TV

William H. Allen
Research on Film Use: Class Preparation

J. M. L. Peters
The Necessity of Learning How to See a Film

Victor O. Hornbostel
Audio-Visual Education in Urban School Systems

Departments:

- Film
- Television
- Book Reviews
- Research Abstracts

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CONTENTS

Articles

- TELEVISION AS A TRAINING AND EDUCATIONAL MEDIUM .. 163
  JOSEPH H. KANNER
  RICHARD P. RUNYON
  OTELLO DESIDERATO
- THE DISENCHANTMENTS OF EDUCATIONAL TV 173
  JOHN MERCER
  SAM BECKER
- RESEARCH ON FILM USE: CLASS PREPARATION 183
  WILLIAM H. ALLEN
- THE NECESSITY OF LEARNING HOW TO SEE A FILM 197
  J. M. L. PETERS
- AUDIO-VISUAL EDUCATION IN URBAN SCHOOL SYSTEMS ... 206
  VICTOR O. HORNBOSTEL

Film

- *Films About Communication* 213
  Robert W. Wagner

Television

- *TV Programs We Haven't Seen* 220
  Dallas W. Smythe

Book Reviews

- ALLPORT, FLOYD H. *Theories of Perception and the Concept of Structure* 229
  Reviewed by Franklin Fearing

- KINDER, JAMES S. AND MCCLUSKY, F. DEAN. *The Audio Visual Reader* 233
  Reviewed by Alexander H. Howard, Jr.

Research Abstracts

- *The Comparative Effectiveness of a Mockup, Cutaway and Projected Charts in Teaching Nomenclature and Function of the 40mm Anti-aircraft Weapon and the Mark 13 Type Torpedo* 238
  G. M. Torkelson

- *The Relative Effectiveness of Training Aids Designed for Use in Mobile Training Detachments* 239
  Robert A. Swanson

- *Comparison of Training Media: Trainee Manipulation and Observation of Functioning Electrical Systems Versus Trainee Drawing of Schematic Electrical Systems Technical Report SDC 269-7-101* 239
  J. A. Murin, A. W. Vandermeer, and T. Vris

- *The Training Effectiveness of a Tank Hull Trainer* .. 240
  Victor H. Denenberg

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Original manuscripts, books for review, and editorial communications should be sent to the Editor: WILLIAM H. ALLEN, Department of Cinema, University of Southern California, 3518 University Avenue, Los Angeles 7, California.

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TELEVISION AS A TRAINING AND EDUCATIONAL MEDIUM

• JOSEPH H. KANNER
• RICHARD P. RUNYON
• OTELLO DESIDERATO

This paper summarizes the implications of TV research upon training and education. It draws particularly from the authors' own studies in the military use of TV. *Joseph H. Kanner is Chief of the Training Section, Television Branch, Army Pictorial Service Division, Office of the Chief Signal Officer, U. S. Army. Richard P. Runyon and Otello Desiderato are research psychologists with the Pictorial Evaluation Office, Signal Corps Pictorial Center, Long Island City, New York.*

THE METEORIC development of television and its effect upon its viewers' reading habits, morals, taste, and a host of other effects have been the subject of countless articles, arguments, and discussions (1, 8, 11, 12, 13, 14, 15). Equally intensive are the investigations of the training and educational potentials of the medium (2, 5, 6, 7, 9, 10). The amount of research devoted to the teaching potential of television probably exceeds that for such older media as film and radio at a comparable stage of development. It may be strategic, therefore, to survey the general implications of this research for current military and civilian training and educational problems, and to assess promising areas for future investigation.

APPLICATION OF MILITARY TV RESULTS TO CIVILIAN INSTRUCTIONAL PROBLEMS

A striking feature of television research is its almost predominant military background. The majority of important studies spring from military support and utilize military samples and subject matters (6,7,9,10). The reasons for this are probably economic, although a contributing factor has been early military realization of the po-

tential of the medium for solution of pressing training problems. Contrary to popular belief, the authors will testify that television research in a military context often has many advantages. Such factors as the ability to obtain consistent measures of aptitude or intelligence for control purposes, the reliable availability of adequate numbers of trainees and other control features not easily obtained when using civilian samples, are attractive features of military research. However, as in all research findings, the applicability of military research results to civilian problems should be tempered by such considerations as population differences. It is probable that some findings are applicable to high school and undergraduate populations, particularly in the present authors' research (7) since the basic trainees employed were largely drawn from such civilian populations. Their applicability to primary education or advanced graduate work is unknown. Although contemplated Signal Corps research may find applicability to graduate populations, for apparent reasons civilian sources will have to provide definite information on the potentials of television for primary school purposes.

Another consideration may be the distinctions between military and civilian pedagogical philosophies and curricula. With respect to differences in curricula, it is interesting to ask whether the relevant aspects demanding attention are similarities among principles of learning, operating across widely dissimilar subject matters, rather than obvious content differences. The actual mechanism of skill acquisition may be similar among a number of military and civilian subject matters.

INSTRUCTIONAL ADVANTAGES OF TELEVISION

A well-established finding of television research has been the equivalence or superiority of the medium in teaching effectiveness when compared with regular classroom instruction (2, 9, 10). This equivalence was obtained under conditions where television was presented as a controlled version of the classroom instruction with which it was compared (7). For military purposes, these findings are important to any contemplated use of television for transmitting, without *loss* of teaching effectiveness, classroom instruction in situations where little time would be available for change or adaptation. Civilian application of these findings would find support in transmitting current types of classroom instruction with little or no change where factors of economy or time require such usage.

However, this "equivalent" usage of the television medium

fails to take advantage of many television presentation procedures which have shown considerable potential for improving instructional effectiveness. One of these presentation procedures is the closeup, which can be used to great advantage in teaching, for example, the articulation of small moving parts (7: IV). Other procedures include various types of "superimposures," "split-screen" techniques and animation. The closeup is the most familiar apparent advantage of television and its value is generally conceded. However, the effective use of closeups, its relation to optimal learning for particular teaching situations, requires successive trial and measurement. Similarly, the ability to present different types of visual information simultaneously on the TV screen presents an opportunity for obtaining optimum learning effects through visual and spatial contiguity.

With these techniques it is possible to present "right" and "wrong" procedures, or to relate nomenclature to parts. A score of other applications become readily apparent. Here again, however, the optimal juxtaposition, timing and placement of materials on the screen must be based on trial and measurement.

The television medium permits careful control and repetition of such presentations and, through the use of such devices as "cueing" equipment, results in a training or instructional product equivalent to film for constancy. To the psychologist or educator armed with learning principles or even rudimentary hypotheses, the medium offers unexcelled opportunity for exploration and development of effective teaching procedures. But the emphasis should always be on the constant measurement of the effects of these procedures on student learning. Without such objective appraisal, there is no reliable way of determining educational television's optimal utilization.

TELEVISION AND THE INSTRUCTOR

Of paramount interest and importance in the utilization of television as a teaching medium is the role of the instructor. It is relevant to ask what special requirements television imposes upon the instructor. There are many beliefs on what these qualifications should be—personality, warmth, humor, etc. Unfortunately, there is little research supporting these notions. It is perhaps in reaction to the plethora of popular belief in this area that the present authors are exploring the possibility of employing inexperienced instructors to teach a series of difficult hours of electronics.

An important aspect is the problem of question and answer requirements and how they can be met by the television teacher. In most types of military instruction the ability to ask questions and receive answers has come to be accepted as a feature of effective teaching. The apparent difficulties of applying this procedure via the television medium have led to attempts to adapt television to question and answer methods. The use of two-way communication was not found to be entirely satisfactory (2). In our research with basic training courses (7) we met the problem head-on by examining the use and effects of the question and answer procedure as employed in military basic training. A selected number of hours of basic training instruction was monitored and the questions raised, noted, and classified. Examination indicated that the majority of questions did not materially add to the teaching effectiveness of the instruction. Those remaining reflected either omission of material or weak points in instruction and, in some cases, yielded important clues as to how to improve instruction. Steps were then taken to insert omitted material into the TV scripts in order to enhance weak teaching points. In addition, the TV instructor rhetorically raised questions of proven relevance and, after a brief pause, went on to answer them. It is interesting to note that student reaction questionnaires seldom indicated strong desire for question and answer opportunities, when these procedures were used in both TV and regular classroom instruction.

This is not the place for any extended discussion of the rationale underlying the question and answer technique, nor does our research conclude that this procedure is critical in basic training instruction. Our studies do suggest, however, that for some subject matters the benefits of question and answer techniques may be partly achieved by the instructional procedures described above. We believe, however, that there are many instructional situations, particularly in advanced study areas, where this question and answer or "conference" procedure is highly desirable. For example, in courses designed primarily for stimulating effective thinking toward problem solution, TV appears to have obvious limitations. However, it is nevertheless important to determine to what extent such types of instruction can be adapted for TV. One possibility may be a combination of TV and regular instruction. That is, television may be used to transmit certain types of information, which, for various reasons, would be difficult to present effectively in the classroom. Following this, the TV receiver would be switched off

and the instructor and his students could further develop this material by question and answer or conference methods. Other teaching situations, as in the case of graduate seminars, may require more basic research in methods of communication between the TV instructor and his students.

TELEVISION AND THE STUDENT

Television research has often reported favorable student reactions to teaching by television (2, 9, 10). Of more importance is the evidence that effective learning can be produced by TV instruction. A number of questions however, are usually raised with respect to television-student relationships.

One of these questions is related to the apparently passive role the television-instructed student must assume. Generally, television training suggests a picture of the student sitting passively in front of the receiver. There is enough evidence in film research literature (3, 4, 16) to suggest that such lack of student activity or participation is not the most conducive for learning. Early television research and application strengthened this picture, since, for the most part, lecture type materials were televised with little demand upon the student other than listening. Underlying the television research of the present authors was an awareness of this apparent limitation of television training. To meet this problem of passivity in television teaching, it was decided to exploit the use of participation procedures. In our study (7) the trainees were asked at various times to write down materials, call out correct answers and to perform certain manipulations when exhorted to do so by the TV instructor. Particularly impressive was a class in the disassembly of the light machine gun, taught by one instructor over TV to a large group of basic trainees. For this hour of instruction, each trainee was seated at a table with his own weapon and disassembly tool. The general procedure required the instructor on the TV screen to demonstrate step-by-step the disassembly of the weapon, with the students following "by the numbers." In terms of the coordination of instructor-student response, and in terms of adherence to instructions from the screen, the rapport appeared to be at least as effective as that achieved in regular classroom instruction. Moreover, the TV screen gave the trainees a more effective enlarged view of detailed parts and manual operations.

Other forms of participation, where the students were asked

to call out or write down information when requested to do so by the instructor, appeared to be equally effective. It was gratifying to find that in addition to stimulating student interest, these participation procedures also permitted considerable control in eliciting appropriate student responses. For example, if test results indicated that particular areas of instruction were difficult for the students, these areas were incorporated into participation material by having the trainee call out or write down the appropriate answers. It may be concluded, therefore, that participation procedures in television teaching, as in film and classroom instruction, are feasible and effective means of increasing student interest and learning.

SELECTION OF SUBJECT MATTERS FOR TELEVISION TRAINING

Early television research was largely limited to the use of "lecture" materials. That is, the emphasis was upon a speaker or instructor standing in front of a camera transmitting verbal information to his audience. There was little opportunity for the visual component of television to contribute other than occasional use of a chart or training aid. This limitation might provide a clue as to why, under controlled conditions, comparisons between television and regular classroom instruction have indicated little difference in teaching effectiveness. If limited use were made of the visual components, television would offer not much more than radio or "live" voice. The object lesson here is that for an audio-visual medium such as television, much of the advantage is wasted unless the visual component is effectively utilized. For example, even for lecture materials, the verbal material may be supported by superimposures or visual titles of key information.

Other techniques which the present authors found useful were fading in and out of superimposed material and requiring the trainees to anticipate correct answers by writing or calling them out. When combined with the method of presenting the correct answer on the screen after an appropriate time interval, an effective teaching technique can be developed. Here again, is another area for exploring the effective use of television, camera, and screen techniques for developing effective teaching methods. Therefore, it should come as no surprise that, where a combination of visual and auditory information is important for teaching a particular subject matter, television instruction becomes particularly effective. The present authors' research indicated that the teaching of manual or motor skills was particularly adaptable to television. Mention has

already been made of the machine gun disassembly instruction. Another application was teaching the manipulation of a map and compass for determining azimuth, orienting the map by compass and measuring distances. In short, where students were required to manipulate equipment or learn motor skills as they followed the instructor, television proved particularly effective.

In the use of TV for teaching manual skills, the authors noted the amount of control over trainee learning which could be maintained by the TV instructor. That is, if the ideal teaching situation is one in which one instructor can devote his efforts to one student, guiding him and preventing errors, then television appears to approximate this ideal. It may be that a group of 30 to 40 men taught by TV may benefit more from such "individual" instruction than a group of 5 individuals taught by a regular instructor.

In addition to criteria of teaching effectiveness, the selection of subject matters for television instruction should also be determined by protential administrative advantages of the medium. For example, it is apparent that one instructor can teach as many students as the number of receivers permits. This would enable the use of the most effective instructor for a maximum audience.

The medium can also be adapted to existing instructional situations by having selected portions of the lesson taught by television to a number of discrete classes in which a particularly effective instructor or a demonstration difficult to present otherwise would be offered. Following the television instruction, the receivers would be turned off and individual instructors would take over, developing the teaching points by question and answer or other methods.

Our general approach in recommending subject matters for television use has been qualified by the considerations described above. It would be a mistake to eliminate any subject matter on an *a priori* basis. Our experience in adapting seemingly difficult subject matters to television teaching has not only resulted in the discovery of new and effective techniques but has led to the belief that TV subjectmatter feasibility is best determined by trial and test.

TESTING TELEVISION INSTRUCTION

Two important conclusions derived from our research are: (a) the importance of testing or measuring the teaching effectiveness of television instruction and (b) the development of testing techniques which are valid measures of television instruction.

With the multiplicity of television presentation techniques

available, it becomes apparent that unless some objective measurements of teaching effectiveness are utilized, there exists no accurate way of discriminating between effective and ineffective teaching procedures. These considerations apply, of course, to any method of teaching, but become particularly acute with educational television because of its newness and lack of information on the variety of instructional techniques it permits. When students are tested there is opportunity to drop ineffective sequences, eliminate materials not contributing to learning and to revise or incorporate effective materials and procedures. When tests or measurement are not used, there is usually recourse to personal opinion, judgements or feel ings. These are not reliable indices of instructional effectiveness and often result in random ineffective use of television. This testing need not be continuous and may be dropped when an effective presentation for a particular subject matter has been developed. However, any proposed changes or innovations in materials and techniques should be tested and their inclusion or rejection based on such measurements.

The adequate testing of television instruction presents a problem too complex to fully discuss in these pages. However, some reference should be made to the requirements of television testing.[1] As indicated previously, effective television teaching should make use of both the audio and visual components of the medium. The usual type of paper and pencil test using multiple-choice or essay questions fails to measure adequately the visual portion of TV instruction. In this connection, the authors found picture identification test items of value. However, any effort in testing TV instruction soon indicates that flexibility in selecting the appropriate testing instrument is required. For example, in our research, subject matters demonstrating action sequences or movements were taught. Standard testing techniques did not appear to fully measure student comprehension of such materials. In such cases, tests requiring basic trainees to manipulate or disassemble equipment were employed (7). In other situations it was felt that a "dynamic" test in which movement could be demonstrated, stopped and started for questioning purposes, would provide a more valid measure of such instruction. Ongoing studies of the possibility of using TV or kinescopes for proficiency testing purposes show promise for the development of new and important techniques and methods.

[1] This subject will be more fully discussed by the present authors in an article submitted to the *AV Communication Review* on "Factors Leading to Effective Television Instruction."

SUMMARY AND CONCLUSIONS

An attempt was made to summarize the implications of television research to date upon the training or educational use of the medium. The instructional and administrative advantages of television were discussed with respect to their potential teaching applications. In addition, research findings on instructor and student requirements and subject matter selection for television teaching were developed. Finally, the importance of testing and developing test-measurement procedures adapted to television was emphasized.

There is general agreement that television has a promising future both for military and civilian training and education. There are many important areas of research and evaluation which remain to be explored. But research to date has already uncovered information and methods which permit both military and civilian users to bridge the gap between television research and its application to many everyday instructional and educational situations.

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THE DISENCHANTMENTS OF EDUCATIONAL TV

• JOHN MERCER

• SAM BECKER

In contrast to the preceding paper, this article presents some views critical of educational television as a formal educational device and points out limitations of the medium. Sam Becker is assistant professor of speech, radio and television at the State University of Iowa. John Mercer is assistant professor of cinema at the same university and editor of the Journal of the University Film Producers Association.

MUCH HAS been written concerning the potential of educational television. Little has been written of the overwhelming problems which must be overcome before this potential can be realized. Workers in the field, as well as civic-minded boosters of ETV, have tended to view their efforts with something less than complete objectivity. Rather than overlook failures for fear of losing job or face, we who are interested in educational television should examine such failures in the hope that ways may be found to overcome them and thereby turn loss into profit for this valuable communications device. Some of the shortcomings mentioned below are undoubtedly temporary, but they are important to those in, and entering, the field at this time.

We believe that many of the inadequacies of ETV have grown out of the lack of an adequate philosophy or even a definition of it. Everything viewed on TV is an educational experience in the sense that we learn something from everything we see. But just as it would not be well for schools to adopt the attitude that they can do anything they please, since everything is "educational," so it would be well for us to evolve a more precise delineation of what we should try to do educationally by way of television. We are primarily concerned here not with news programs or the Sunday-to-Sunday hodge-

podge of *Omnibus*, but with a long-term, comprehensive attempt to impart an organized body of skills, knowledge, incentives, or values to a group of learners who are making a special effort to master them. We hasten to admit, however, that there is a place for the topical and cultural programs.

Fundamentally, what is good education anywhere is good education on TV. The fact that information can be spread more widely by means of TV doesn't lessen the responsibility for good educational practices. The extent to which TV's educational limitations have sometimes been glossed over or completely disregarded to date leads one to suspect that ETV is being guided by promoters rather than educators.

One of the obvious limitations of TV is the loss of "feedback" or interaction between the telecaster and the viewer. Programs shown to audiences which are not connected with the TV studio by means of radio or two-way TV allow opportunity for "feedback" only by telephone or mail. This is a decided disadvantage educationally. Even the state college extension worker who can reach 4000 or more persons by TV, instead of 75 in a day's automobile trip, still has to travel around to answer questions and keep up contacts if he is to remain an adequate teacher. Most teachers have learned that questions, and answers, and discussion should immediately follow the stimulus in order to achieve optimum effectiveness. The educational importance of this latter type of activity has been pointed up by Blume (1: 37-38), who concluded that in teaching problem-solving skills even the least efficient discussion situation is superior to most lectures! The difficulty of discussion in TV is obvious.

Television has been hailed as the answer to the teacher and classroom shortage in institutions of higher learning (14: 16). Closed-circuit TV has possibilities in this area, but at least two factors—costs and scheduling—must be considered. In the present closed-circuit experiment at the State University of Iowa, the following ten people are needed three hours a week for the "production" of a course in Comparative Governments: one instructor, two proctors, two cameramen, combination floor director and dolly pusher, video control engineer, audio engineer, switcher, and director.

There seems to be little basis for claiming that TV can solve the problem of shortage of elementary and secondary teachers and classrooms. To have effective public-school TV we must first have the classrooms to hold the pupils, then trained teachers to motivate them and to follow up the television programs with proper activities.

In 1953, we needed 73,421 classrooms to relieve overcrowding, 45,316 more to house enrollment increases, and 126,680 to replace those obsolete (13). But suppose a school system has adequate classroom space but a teacher shortage. What in fact is meant by "teacher shortage"? Here are some precise examples in Iowa. This year Janesville lacked an eighth-grade teacher. Story City had no high-school science teacher, and Marion had no girls' physical education teacher. How could an ETV station in the area specifically take the place of the eighth-grade teacher, the science teacher, or the girls' physical education teacher? Just exactly how would the station teach the needed 18 hours each day? When considered on this practical basis, some of the claims made for TV became almost laughable.

A well-qualified teacher is needed, moreover, to introduce, explain, and clarify what the pupils see, even when good TV programs are available. This principle, long held by educators in relation to other audio-visual aids, has been pointed up specifically in regard to television in the Montclair study (9: 49). This investigation disclosed that in each of the nine TV programs presented to fifth-grade pupils by six expert teachers, at least one of the viewing teachers found something that puzzled her pupils, and in some programs the majority reported difficulties of this sort.

Present knowledge indicates that audio-visual aids are most effective when integrated with the continuing program of learning (2: 75; 3: 19). Thus the teacher as integrator becomes the key factor in the success of classroom TV. Rather than taking his place, television makes the teacher more important than ever. A foundation of adequate classroom facilities and competent teachers is therefore essential to a successful program of in-school television instruction.

The implication of mass in-school learning via TV is that large numbers of teachers must arrange to have large numbers of pupils ready to see a program when it goes on the air. This does not appear to be a problem at the elementary level where a teacher can rearrange her schedule with comparative ease. At the secondary level, on the other hand, class schedules are much more rigid. An attempted rearrangement of the time of one class can disrupt the entire school. Even a rescheduling of programs is usually not effective because high schools in different towns change classes at different times and teach comparable courses at various times of day. It is conceivable that all schools in the state could be induced to teach the same subject at the same time, but there is reason to believe

that some would be able to move ahead more rapidly than others. If we don't allow for this condition, what happens to our sound educational practice of adapting to the varying progress of our students?

Although a number of studies show that large numbers of persons watch adult educational programs, the consistency with which viewers watch a particular series appears to be low. An investigation by the United States Department of Agriculture (12: 5) revealed some figures concerning *Let's Make a Dress,* an ETV series of 11 programs each lasting 12 minutes. Of the 251 women interviewed who had requested a bulletin accompanying the series, 91.2 percent saw at least one program. The average "attendance" was 43.8 percent. Only 2.4 percent of the women saw all 11 programs and over 50 percent of those who saw any program at all were interrupted "occasionally" or "frequently" during the programs. Anyone who has ever taught can appreciate the problem of the educational program planner who must deal with this intermittent viewing. How can an educational structure be soundly built if over half of the learners have missed a good portion of the foundational information by the time the program series is half over? To a classroom teacher, this kind of attendance would create an impossible situation.

The shortage of trained production personnel is one of the characteristics of ETV today. This is not an especially serious problem since it appears to be easing. Of graver consequence, primarily because there are no signs of a change, is the fact that in some cases ETV appears to be dominated by persons who are not educators. They tend instead to be promoters, commercial TV persons, or simply individuals who have been disillusioned or unsuccessful in some other field and who feel that this is a chance to hop on the tail of a winner.

The danger here is that ETV might become all ballyhoo without real foundation or a second-rate imitation of commercial TV. If it is even to approach its great potential ETV must be directed by persons who are primarily educators but who are also well grounded in the essentials of television. There are not many such persons now available. In many cases, promising educators must be given special training in the so-called "television techniques." This is certainly more practical than selecting persons with television know-how and trying to give them educational background and philosophy. In any case, these people are going to cost money and this brings up another vital point.

The history of education is filled with evidence of constant tre-

mendous demands on limited educational funds. There is no reason to expect this situation to improve. Even though enlightened citizens and legislatures are attempting to increase funds, demands are more than keeping pace. For this reason it would appear that ETV will be forced to operate, in most cases, with limited resources. As those who have been in this business know, there is nothing cheap in television. For these reasons, ETV will be operating on extremely restrictive budgets for as long as one can now forsee.

Some stations and production centers are making use of considerable student help. One disadvantage of this is that by the time students become well trained they are ready for graduation. Even with the free labor of students and the almost-free labor of faculty members, other necessities send costs spiraling. Technicians to maintain the equipment must be well paid in order to avoid having them pirated away by commercal TV. Unlike the professional college teacher whose career knows neither regular hours nor hour limit, these technicians prefer a regular 40-hour week and extra pay for overtime.

In the larger communities, the problem of the union scale is certain to arise, as it already has to a degree in St. Louis. What will campus reaction be to hiring a cameraman or video control operator who makes more than a professor of electrical engineering, perhaps twice as much as a young PhD in English? Labor costs are only part of the high price of television. One cannot scrimp on tube replacement or lighting instruments, to say nothing of the initial cost of equipment.

Kinescope recording, which theoretically offers great possibilities for the re-use of programs in order to bring down costs, is a highly risky and uncertain method.

The problems connected with this process seem unending. ABC-TV in Chicago refuses to be responsible for the quality of any of its kinescopes and so warns all prospective purchasers.[1] Here at the University of Iowa we have been unable to achieve consistently satisfactory kinescope quality, more than 16 months after our recorder was plugged in. Other studios, both commercial and noncommercial, are having like difficulties. Magnetic recording will eliminate the chemical processing of photographic film but many other electronic problems remain.

The use of locally-produced motion pictures likewise brings on a

[1] Statement by Dan Schuffman, program manager ABC-TV, Chicago, Illinois to one of the authors, December 28, 1954.

host of problems. The amount of time needed in the shooting and editing of film is often too great for TV. Fast laboratory service is essential, and the problems of operating a motion picture processing laboratory are numerous and well known.

Up to this point, we have mentioned only a few of the necessities for turning on the equipment and getting a picture. The question of what that picture shows is another matter. In other words, there are programming costs which must be met. Admittedly, one can stand a lecturer in front of a flat and he can simply lecture, thus cutting production costs to almost nothing—and the audience, in most cases, along with it. Even if one had twenty-five or thirty Frank Baxters or Francis Horwiches on one's campus there must be variety in a program schedule. A certain amount of imaginative, creative productions are essential and, as the Educational Television and Radio Center is rapidly discovering, these must have a decent production budget if they are to be well done.

Last year KETC-TV, the St. Louis educational station developed a successful children's program around Sonny Fox, a talented young man who appeared as "The Finder." Recently, however, Mr. Fox left KETC-TV to begin a similar program for CBS. Thus there is reason to believe that other successful personalities developed by educational stations may find that they can earn more money in commercial TV.

Many applicants for ETV channels apparently either have large hidden funds or they are displaying extreme naïvete in their estimates of operational costs for their first year. The San Antonio (Texas) Council for Educational Television, Inc., for example, estimated $30,000 as the first year operational cost (5). In case this would lead the reader to believe that they no longer do things big down in Texas, let us compare this to some of the other educational applications. The Lindsey Hopkins Vocational School of Dade County Board of Public Instruction in Miami, Florida, estimated $25,000 for the first year of operation (7). The University of Illinois estimated $24,000 (6), and the Wisconsin State Radio Council estimated $40,000 for its station in Madison (5) and $20,000 for the one in Milwaukee (8). Compare this to production costs of the *cheapest* programs on the commercial networks (11: 103). ABC-TV's *Sky King* is reported to cost approximately $8,000 *per show*, NBC-TV's *Greatest Moments in Sports* and Dumont's *Life Begins at 80* cost about $5,000 per show, while CBS TV's *Sports Spot* has a budget of $1,500 per week. Thus, the cheap-

est of these, if run for 52 weeks, would cost $78,000. *Omnibus*, the commercial experiment of the Ford Foundation's Radio and Television workshop, has a weekly production budget of approximately $65,000 (4). This figure does not include air time or commercials. Admittedly, union wages and other factors in a network drive costs up, but the disparity is too great to be accounted for by this alone. We are not questioning the possibility of operating on a limited schedule for the amount of money noted in the above ETV applications, but rather the desirability. If ETV is to succeed, the quality must be such as not to completely destroy the rosy picture that its promoters have been busily painting for the past few years. To attain this quality, adequate operating budgets must be obtained.

The idea that a city or university campus is an inexhaustible source of TV talent and material is, to a great extent, a myth. Obviously, there are talented people available; but the abler they are, the more their services are in demand. Even such an exponent of ETV's virtues as President John Schoff Millis of Western Reserve University notes that it takes a great deal more time to prepare a simple television lecture than it does to prepare for one's regular classroom performance. As President Millis said, after extolling television teaching, "Whereas three hours may prepare a 50-minute lecture, something like 20 to 30 hours is required to prepare a 27- or 28-minute discourse for the television audience." [2]

In this connection it is an unhappy fact that these many hours spent in preparing the television "discourse," to say nothing of an entire series, bring little academic recognition. It is still research and publication which lead to promotions. Most professors of ability know this full well, and it is only natural that they should prefer to spend their time in investigation and writing rather than in TV. Besides the professional pressures in other directions, time is always short for the scholar. He must keep up with his field. It is becoming increasingly difficult to do this, even in this age of specialization. Rare is the professor without a stack of unopened journals which he must read. Though the writers have been referring specifically to persons in the academic areas, an analogous situation exists among businessmen and others who might be called upon to participate in the programs of a community station.

One of the most disenchanting things about educational television to date is the lack of evaluative study and research. Probably,

[2] Address on April 21, 1952 at University Park, Pa., reported in the phamphlet *Educational Television* by Martin Packman, Editorial Research Associates.

at this time, a major part of our effort should be bent toward evaluating the offerings which we now have, instead of trying to increase them without knowing whether what we are doing is good. We must also avoid falling into the trap of commercial research, so-called, in which we simply count the number of sets turned on or the number of persons sitting in front of those sets. We must attempt to go deeper and find what happens to those persons, or fails to happen, as a result of our programs.

One example of how misleading a simple counting of viewers can be is the University of Iowa's experience with a series of programs produced for seventh and eighth grade pupils. An initial survey indicated a good-sized audience. A follow-up showed that a large part of the audience was made up not of seventh and eighth graders, but of teachers and pupils in grades 1 through 12! (10: 10). The question now is, why did this occur and what can be done to prevent its recurrence? Is it a matter of redesigning the program, of educating the teacher, or of simply setting up better lines of communication to the schools?

Preprogramming investigation to determine what telecasts are needed is an essential which seems too frequently left out. The target audience for a proposed program should be analyzed in terms of its needs, and the program should be presented only if it can meet these needs in a fashion which is unique to television. What has happened too often is that programs are presented because a certain amount of material is available, not because the program can serve a previously ascertained need.

Even worse than the failure to study adequately TV has been our failure to recognize or make use of research done in tangential fields. Information accumulated through years of audio-visual experience and research in radio and films is available. Yet, too often, apparently assuming these problems have never been met before, we have gone blindly ahead repeating the mistakes radio and film made 20 years ago on such things as study guides and the importance of curriculum integration.

Another of the most serious problems in ETV is the great pressure of programming—filling the time that is required to keep the station on the air. Being forced to meet deadlines often acts as a depressant on creative activity. As one person at an educational station stated, "Every day is a crisis. We wind up feeling that we were lucky to have gotten anything on the air." How much more luck it takes for that "anything" to be educational!

We have attempted to raise what we believe are some of the more pressing problems which educational television faces today. We do not mean to berate education's pioneer efforts in this field, for, in many cases, outstanding work has been done. Nor do we seek to engender the feeling that educational television cannot provide a worthwhile service. We would not be working in the field if we so believed. We do mean to bring out into the open some of these questions which have too often been drowned out by promotional blurbs or simply left unasked. We don't believe that educational television can ever attain maturity if we don't face up to our failures and our inadequacies, and admit our limitations.

There are no easy solutions for most of the problems here raised. For some, possibly there is no solution at all. Whatever tack is taken, television must be considered as a part of the total educational picture. With this in mind, the authors offer for the consideration of all persons interested in educational television the following suggestions:

1. First of all, and probably most important, we should work for an improved educational system at every level. Without adequate classrooms, superior classroom teachers, and a well-rounded program of adult education, educational television can do little good.

2. We should attempt continually to integrate better our telecasts with these overall educational programs.

3. We should encourage the training and hiring of qualified educators for policy-making positions in educational television.

4. We should inform city and college administrators, state legislatures, and others concerned with the problem of improved education of the true costs of educational television, and then assist in raising adequate funds.

5. In the college or university, a policy of lightened academic loads and suitable academic recognition must be inaugurated for those participating in educational television programs. The first portion of this policy has already been instituted in some schools. The second will be more difficult but is also more important. Some comparable arrangement must be designed in the non-academic situation.

6. Lastly, we should devote a far greater proportion of our time, effort, and budget to controlled experimentation and investigation. It is only through honest evaluation that educational television can hope to approach its fullest capacity of service.

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RESEARCH ON FILM USE: CLASS PREPARATION

•WILLIAM H. ALLEN

This review of research on the effects of class preparation for an instructional film is the first in a series of reviews of the literature on film utilization. William H. Allen is associate professor of cinema and education at The University of Southern California.

TO WHAT degree do teacher introductions and class preparation facilitate learning and retention of the information and concepts taught in the instructional films that follow?

There is sufficient data from research in learning to indicate that introductions to the material should provide a favorable motivational "set" and increase the learning over situations in which introductions are not given. These introductory activities could take many forms: (a) descriptions of the content of the film, (b) stress upon the importance of learning the material, (c) teacher- and student-developed questions to which answers will be sought, (d) lists of difficult words to be encountered in the film, (e) announcement that a test will be given after the film showing, (f) clarification of difficult points to be presented in the film, (g) merely motivating the class to view the film more closely, and (h) combinations of these or other stimuli.

This paper will briefly summarize the conclusions from learning research, analyze more completely the pertinent experiments with audio-visual communication materials, and draw appropriate educational implications for teachers.

CONTRIBUTIONS OF RESEARCH IN LEARNING

The application of the principles of learning to the use of audio-visual communication materials is the logical first step to the assessment of the value of any teaching technique. The appropriateness

of such application has recently been pointed out by Carpenter (3: 49) in his statement that "the established principles of learning which have been developed by psychological and educational research have varying degrees of applicability in film mediated instruction, and . . . the application of the best of these principles will improve the effectiveness of film instruction." The implications of learning theory to audio-visual communication research are discussed in greater detail by Smith and van Ormer (11), by Kendler, Kendler, and Cook (6), and by Miller and Dollard (10).

The major learning factor involved in the use of an introduction to prepare the class for the communication material to follow is that of motivation or "set" to learn. The influence of motivation upon learning has been firmly estabished.

McGeoch and Irion (8: 227-28), on the basis of their review of research in motivation, state that "an active set to learn . . . is a powerful determiner of learning, whether the learning be the fixation of a verbal series, the establishment of a conditioned response, or the discovery and fixation of the solutions of perceptual-motor and rational problems. The set may be established by formal instructions or may arise from the experimental situation and the subject's own reaction systems."

Kendler, Kendler, and Cook (6: 5) point out that "in human learning the correct response can be called forth very early in the learning by a careful set of instructions. If these instructions are clear and forceful enough to elicit the correct response and if this response is rewarded, training time can be reduced considerably."

Miller and Dollard (10) suggest that one might expect "introductory materials to be able to favor responses by increasing motivation and by getting students set to make specific types of responses."

McGeoch and Irion (8: 224-25) also point out that the instructions and sets exercise an influence that is specific to the particular instructions given rather than general, and that instruction and set to learn are "more effective for learning than is the set merely to observe."

The generalizations from research in learning seem clearly to indicate that introductions to the communication materials to follow should increase significantly the learning of that material. Specific instructions should result in greater learning than more general instructions to observe.

REVIEW OF COMMUNICATION RESEARCH

A number of experimental studies have been conducted with instructional films in which the use of teacher introductions and class preparation was one of the variables. Only the portions of those studies that compare the use of introductions with other instructional techniques will be discussed in this paper.

Wittich and Fowlkes Study (14). Three methods of using 27 social studies and science films with fourth-, fifth-, and sixth-grade students were compared: (a) no organized class preparation, followed by the film and an information test; (b) class preparation amounting to the reading of a brief descriptive story of the content, a study of difficult words and phrases, and a study of questions related to film content, followed by the film and the test; and (c) repetition of the second procedure plus the answering of discussion questions and the viewing of the film a second time, followed by a second administration of the same test. The investigators found very significant gains for both the second and third methods. The addition of the introduction increased learning by an average of 38 percent over the "film alone" methods, and the third method added another 40 percent of material learned. However, the third method required considerably more time to accomplish the increase. No delayed recall test was given; so we have no way of knowing how well the material learned was retained. Wittich and Fowlkes conclude that the use of introductions caused children to become "increasingly able observers; that is, they increase their ability both to observe factual information and to use this information in answering test questions which probed their ability to make social judgments not specifically identified with the film itself or with the sound track" (14: 99).

Hovland, Lumsdaine, and Sheffield Study on Map-Reading (5:141-46). Trainees in a Quartermaster Replacement Training Center were shown a 43-minute film on map-reading, using three alternative procedures: (a) the film alone; (b) a 15-20 minute introduction in which the instructor called attention to important points to be learned and the importance of learning how to read maps, followed by the film; and (c) the showing of the film without an introduction, followed by a review exercise taking 20 minutes and consisting of 15 true-false questions covering the major topics of the film and discussed by instructor. The test, given to all groups, contained 39 multiple-choice items of factual information. Both the

introduction and review methods resulted in statistically significant gains over the use of the film alone, the introduction being slightly (but not significantly) superior to the review. A further analysis of the data, in which learning of "topics covered in the introduction" was compared with "topics *not* covered in the introduction," showed that, although the introduction had a greater effect upon the learning of the topics covered, it also had an appreciable (though not as great) effect upon topics not covered in the introduction. This finding led the authors to conclude that "the introduction had a motivating effect that made all parts of the material better learned." The use of both the introduction and review favored slightly (but not significantly) the men of lower intelligence.

Allison and Ash Study (1). This study was conducted to test how well 480 college students in an introductory psychology course learned from films under three degrees of motivation: (a) instructions designed to *decrease* motivation to learn by lowering their anxiety about learning from the film; (b) instructions designed to have a *neutral* effect; and (c) motivational instructions designed to *increase* anxiety about learning. Following the instructions, each group saw the same film and took the multiple-choice test. A control group took the test without seeing the film. It was found that increasing amounts of anxiety-producing instructions resulted in significantly greater learning. The higher learning scores were achieved by the "motivational" instructions, the next by the "neutral" instructions, and the lowest by the "anxiety-relieving" instructions. There was no relationship between the amount of chronic anxiety an individual had and the amount he learned from the film. The authors conclude that "anxiety produced by the use of suitably worded instructions can have a beneficial effect on the learning of complex materials from films" (1:8).

Stein Study (12). In this study an effort was made to ascertain whether a prefilm test followed by the showing of a film would produce more learning of factual content than showing the film only once or showing it twice in succession. Two identical studies were made, each using a different film, with a total population of 3400 Navy recruits, divided into 17 groups for each study. The study resulted in statistically significant gains for the experimental group that was exposed to the *identical* prefilm test immediately followed by the film. These gains amounted to 19 percent and 27 percent over the "film once" group and 12 percent and 18 percent over the "film twice" group. Somewhat lower, but

significant, gains held when the men were retested a week later. It should be noted, however, that the control group having the prefilm test (*but no film*) under the same conditions as the superior experimental group did almost as well as the "film once" group on one film and better than the "film once" and "film twice" groups on the other film. This finding suggests that the final test was testing to a large degree the recall of the identical prefilm test as well as learning contributed by the film.

Hovland, Lumsdaine, and Sheffield Audience Participation Study (5: 228-46). A sound filmstrip on the teaching of the Signal Corps phonetic alphabet and pronunciation of numerals was shown to 16 groups of new Army Reception Center recruits totaling 742 men, under four conditions of presentation: (a) a "standard" filmstrip in which review lists of each phonetic name with its corresponding letter was pronounced by the narrator; (b) a "participation" filmstrip in which these letters were followed by a question mark and the names were to be pronounced by the audience; (c) the announcement preceding the "standard" version that a test would follow the showing, and (d) the same announcement prior to the "participation" version. A sample of men was given individual oral tests of their ability to recall the phonetic names, and the remainder of the men were given written tests. The results show that the added incentive to learn provided by the announcement of the test resulted in significantly increased amounts of material learned (23.3 percent) over the "standard" version with no test announcement. The combination of "participation" procedure and the announcement of the test added only 6.4 percent more material learned.

Michael Study (9). This study also investigated the effect of the announcement of a test in advance of the film showing. In this case, the film, *Pattern for Survival,* was shown to 8 experimental and 3 control groups of high-school juniors and seniors under several conditions of participation and motivation. But contrary to the findings of the Hovland, Lumsdaine, and Sheffield Audience Participation Study (5), the advance announcement of the test resulted in no significant increase in learning. This finding prompted the investigator to conclude that "for subject matter with high intrinsic interest and groups tending to have an orientation to tests similar to that of high-school students, the other two major variables so override this one that its effects are insignificant. However . . . there are considerable experimental data to indicate

that under many circumstances the test announcement factor can be an important motivator" (9: 40).

VanderMeer and Cogswell Study (13). This study investigated the effects of the film, *How To Operate the Army 16mm Sound Projector Set,* upon the actual learning of the projection skills by Army trainees in a Projectionist School. The results showed that (a) preparation of the trainees for the film by giving them direct acquaintance with the task to be performed resulted in more learning, and (b) trying to perform the skill before being instructed on it is better preparation for learning the skill than merely reading about it.

Lathrop Study (7). Although not comparable with studies that employ teacher introductions or other methods of "set-inducing" directions apart from the film itself, this study is concerned with the contributions to learning of introductions "built into" the film. A comparison was made between three films having "good" introductory sequences and the same films with the sequences removed. About 500 ninth-grade high-school students were divided into three groups (introduction, no-introduction, and control) and were rotated so that each group became a different experimental group for each of the films. The results show that for two of the films the introductions made small contributions to learning, but for the third the introduction had an *adverse effect* upon learning. The author concludes that "among existing films, typical introductory sequences can make small positive contributions to learning, while in other instances introductions may have an adverse effect on learning, possibly through misdirecting the student's attention" (7: 12).

Buswell Study (2: Chapter VI). Although not a film study, Buswell's research on the perception of still pictures contributes further evidence on the problem. He photographed the eye movements and fixations of individuals looking at photographs and found that special directions to look for certain things in the picture produced a much more detailed examination of the picture and also longer eye fixations.

In order to simplify the interpretation of the research on teacher introductions and class preparation for film showings, the data for the eight studies are summarized in Table I.

TABLE I — SUMMARY OF RESEARCH ON USE OF INTRODUCTIONS

Study	*Content*	*Compared Groups*	*Comparisons Made*	*Findings*
Wittich and Fowlkes	Social Studies and Science	4th, 5th, 6th grade Students	(a) Film alone (b) Class preparation (c) Class preparation plus test, discussion, and second film showing	(a) 38% gain* of class preparation group over film alone group (b) 28% gain* of class preparation plus discussion, etc. group over class preparation group
Hovland, Lumsdaine, and Sheffield (Map-Reading Study)	Map-Reading	Army Trainees	(a) Film alone (b) Introduction to film (c) Review of film	(a) 10% gain* of introduction over film alone (b) 3.4% gain of introduction over review
Allison and Ash	Introductory Psychology	College Psychology Students	(a) Anxiety-decreasing instructions (b) Neutral instructions (c) Anxiety-increasing instructions	(a) Learning increased with greater amounts of anxiety-producing instructions*
Stein	Scientific	Navy Recruits	(a) Prefilm test on factual content (b) One showing of film (c) Two showings of film	(a) Prefilm test containing identical items as final test and with complete knowledge of results superior to "film once" and "film twice"*
Hovland, Lumsdaine, and Sheffield (Audience Participation Study)	Signal Corps Phonetic Alphabet	Army Recruits	(a) "Standard" filmstrip (b) "Participation" filmstrip (c) "Standard" filmstrip preceded by announcement of test (d) "Participation" filmstrip preceded by announcement of test	(a) Announcement of test increased learning 23% over "standard" version* (b) Announcement of test and "participation" version added only 6% more material learned

Table I (continued)

Study	*Content*	*Compared Groups*	*Comparisons Made*	*Findings*
Michael	Civilian Defense	High-School Students	(a) Announcement of test (b) No announcement of test	(a) No significant differences between the two methods
VanderMeer and Cogswell	Operation of Motion Picture Projector	Army Trainees in Projectionist School	(a) Pretest of skill on projector before seeing film (b) Film shown before performance test on projector (c) Reading of performance test checklist before seeing film (d) Two film showings before performance test	(a) Performance preparation on the motion picture projector increased learning of the skill from the film**
Lathrop	General Science	9th grade Students	(a) "Built-in" introduction in film (b) No introduction	(a) Two films with "built-in" introductions resulted in small gains (b) On one film the "built-in" introduction *decreased* learning*
Buswell	Various Still Pictures	Elementary, High-School Students, Adults	(a) Effect of directing viewer's attention to certain things in still pictures	(a) More detailed examination of picture** (b) Longer eye fixation**

* Statistically significant differences.
** Statistical significance not stated.

DISCUSSION OF THE FINDINGS

Comparison of Introductions with Films Alone

Of the seven studies that measured the effects upon learning of some form of motivational or set-inducing introductions, either by the teacher or as class preparation, only the Michael Study (9) resulted in inconclusive evidence. The others demonstrate rather forcefully that *teacher introductions to and class preparation for film showings produce significant learning gains over conditions in which the films were shown without such introduction.* It is worth noting that the investigators in the Commonwealth Office of Education Study (4) were so convinced of the values of film introductions as a technique of use that they used it in combination with every variable studied.

The evidence presented by the Michael Study to the effect that the announcement of a test produced no significant increase in learning is contradicted by the Hovland, Lumsdaine, and Sheffield Audience Participation Study in which it did. Michael himself interprets his findings with caution, intimating that his study may, in fact, be a special case. Therefore, the very tentative conclusion is that a prefilm test announcement may, under certain conditions, result in increased learning (particularly in that Michael's data *did* show consistent but insignificant advantages to the test announcement version).

The Lathrop Study should not be considered too important in this discussion because it studied the effects of "built-in" introductions in the film, and they might be considered *a part of the film* itself rather than *a technique of using the film.* Also, the investigator had to use *existing* films rather than specially produced films designed to study this variable. Nevertheless, the study does serve as a warning to film producers who might interpret the general conclusions from the other studies as proving that *any* introduction is motivational and should therefore increase the learning.

Comparison of Introductions with Reviews

The evidence is less clear when the effect of the introduction is compared with that of the review and discussion of the material taught. Only the Wittich and Fowlkes and the Hovland, Lumsdaine, and Sheffield Map-Reading studies compared these two techniques. Even so, the procedures used in the reviews were so

different that the studies are actually not comparable. The only factor common to both studies was that of "time spent" by each of the two methods. This factor of "time spent in relation to amount learned" or "efficiency" is subject to personal interpretation and will be discussed in greater detail in the following section. However, if the factor of "time spent" is taken into account, *the use of the introduction and the use of the review would appear to be fairly comparable in their effects upon learning, with a slight advantage to the introduction.*

The Factor of Total "Time Spent" in Instruction

In assessing the value of any teaching technique, the "time spent" in instruction is a factor to consider. The degree to which it becomes the controlling factor is a judgment matter and is subject to the characteristics of the task, the learner, and the learning situation. For example, if the task is that of learning a specific skill, and if additional time and instruction is needed to teach the skill, the teacher's judgment would probably prompt him to spend that additional time. In this case, it would be a question either of learning or not learning. If, however, the task is that of increasing the knowledge of a broad subjectmatter area, the teacher's judgment might lead him to use that time in another way that would produce other kinds of learning.

The problem is not this simple, of course. In order to make such a judgment, the teacher must know *how* the time will be spent if it is not spent in further learning of the same task, and he must weigh these possible advantages against each other. Then, too, the characteristics of the learner have to be considered and his ability to profit from additional instruction. Not the least of all is retention of material learned. Will further teaching reinforce the learning and cause it to be remembered longer?

In the Wittich and Fowlkes Study the use of an introduction seemed to be a more "efficient" method than the use of either the film alone or the method that combined the introduction, test, and summary. In the Hovland, Lumsdaine, and Sheffield Map-Reading Study the film alone appeared to be the most "efficient" from the point of view of total time spent, and the introduction was slightly more effective and "efficient" than the review. It should be noted that these two studies vary in their use of the review technique. These relationships are shown in Table II. Inasmuch as neither study tested the retention of the material learned, it

is impossible to determine the long-time effectiveness of the methods.

Although the above analysis suggests "greater learning per time spent" for the introduction (in one case) and the film alone (in the other), the results are by no means conclusive. "Desirable learning outcomes" and "efficiency of instruction" are not the same thing.

TABLE II — RELATIONSHIP OF IMPROVEMENT TO TIME SPENT

Comparison of Methods	*Percent of Improvement*	*Percent of Increased Time*
Wittich and Fowlkes		
Introduction over Film Alone	38.2*	28.6
Introduction, Test and Summary over Introduction	28.3*	100.0
Introduction, Test and Summary over Film Alone	78.3*	157.0
Hovland, Lumsdaine and Sheffield (Map-Reading Study)		
Introduction over Film Alone	9.7*	40.7
Introduction over Review	3.4	−3.8
Review over Film Alone	6.0*	46.5

* Statistically significant differences.

Effect of Specific vs General Instructions

McGeoch and Irion's (8: 224-25) generalization that effects of instructions are specific to the particular instructions given is submitted to a test by Wittich and Fowlkes and by Hovland, Lumsdaine, and Sheffield (Map-Reading Study). There are really two factors to consider: (a) Do introductions have a greater motivating effect upon materials specifically covered in the instructions than upon accompanying materials? (b) Do specific instructions also have a motivating effect upon other material not covered in the instructions?

Both studies answer "yes" to both of these questions. As would be expected, however, the effect of specific instructions is greater upon those points to which particular attention has been called. Because this finding needs further investigation, we can make only a tentative conclusion at this time: *introductions have a motivating effect upon all parts of the film to follow, but a greater effect upon those parts especially covered.*

General Conclusions

On the basis of the present evidence, the following conclusion can be made with a reasonably high degree of certainty:

1. *Teacher introductions and class preparations for film showings result in significantly more factual material learned than merely showing the film without an introduction.*

The following conclusions can be advanced as tentative hypotheses, subject to further investigation:

2. *Teacher introductions to film showings are about equal in effectiveness to reviews after the showings in the teaching of factual information.*

3. *The prefilm announcement of a test to follow the showing results in increased factual learning over the condition in which no test is announced.*

4. *Introductions have a motivating effect upon all parts of the film to follow, but a greater effect upon those parts especially covered.*

Problems Needing Further Investigation

A number of problems relative to the use of teacher introductions and class preparation to film showings are raised by the studies reviewed above. A few of them are:

1. How does one determine the optimum amount of time to spend in any teaching situation in order to obtain the optimum amount of learning? What teaching methods most nearly meet these optimal conditions?

2. How do teacher introductions compare with student introductions in effectiveness?

3. How do introductions compare with other methods of use in facilitating the retention of material learned?

4. Are introductions as effective in improving other kinds of film-mediated learning such as perceptual-motor skills, attitude-changing material, and such?

5. How do simple introductory instructions compare with more elaborate introductory techniques (such as Wittich and Fowlkes') in motivating students to learn from the film? How do these vary with the kind of material being taught?

6. What is the relationship of the effect of introductions, particularly prefilm test announcements, to the subjectmatter of the film and the characteristics of the learners?

7. Is the increased learning a result of motivation to attend to the material of the film more closely or a familiarization with the important points to be learned from the film? Or a combina-

tion of both? How does this vary with different materials and and different intelligence groups?

8. How does one account for the low motivating effect of the introductions "built into" the films used in the Lathrop study? Can motivational material be developed that can be "built into" films and thus produce significant learning gains?

IMPLICATIONS FOR TEACHERS

The major lesson to be learned by teachers from these studies is that learning can be significantly increased by motivating students to attend more closely to the instructional material to be used. This introductory motivation could take a number of forms:

1. Preparing the class by means of a study of difficult words and phrases to occur in the film
2. Studying questions and problems relating to the film content
3. Raising and listing points to look for in the film
4. Reading a brief descriptive story of the content
5. Pointing out the importance of learning the content of the film by means of (a) a simple motivational statement, (b) anxiety-producing instructions, or (c) the announcement of a test to follow the film showing.

The teacher should consider the use of introductions in relation to the task that is being taught, the characteristics of the students, the situation in which they are learning, and the nature of the material being used. This means that the teacher must use judgment regarding the time spent in preparing the class, the time used in reviews and summaries, the need for a second showing of the film, and the use to which the film learning will be put.

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THE NECESSITY OF LEARNING HOW TO SEE A FILM

•J. M. L. PETERS

This paper by a noted European film theorist presents some thought-provoking ideas on the necessity of teaching children how to see films. J. M. L. Peters is director of the Netherlands Educational Film Foundation, The Hague. This foundation is the official Dutch organization for the production and distribution of educational films to the schools of Holland.

I

NOT ONLY in a metaphorical but also in a proper sense the "film medium" may be regarded as a "language"—in other words as a system of possibilities for representation, expression, and communication. The film-image is not a mechanical reproduction of reality; it is in the same sense as the word a "token" or "sign" of that reality. Just as in word language, it represents this reality each time in a different manner. However, it is the reality of visual and aural impressions—thereby leaving room for the intentions of the maker of the film as well as for the interpretation by the spectators. It derives its value or meaning not only from the thing it represents but also from the manner in which the maker of the film refers to that thing.

Furthermore it serves—to put it in Bühler's terminology—as a means of "representation" ("Darstellung"), "expression" ("Ausdruck"), and also of "Appeal" ("Appell") or "communication," since it refers to a reality experienced by a "speaker" (the maker of the film) and expresses the thoughts and emotions of the speaker in respect to the represented reality and, at the same time informs the "hearers" (spectators) that the speaker has represented a certain matter and has expressed his thoughts and feelings about the matter. Consequently the film-image is a three-dimensional "sign," a *symbol* of the reality perceived, a *symptom* of the inner self of the maker of the film, and a *signal* for the spectator.

Since the film possesses the typical characteristics of the language-signs as understood by modern linguists and psychologists, it is not too bold to conclude that there exists an affinity between language and film and to speak of the film as an autonomous kind of language.

II

The structural characteristics of the film medium are clearly evident when analysing the three processes which have to be passed in making a film, namely: the process of writing the shooting script, the shooting process, and the editing process. First of all, the event taking place in the film appears to consist of a number of separate fragments. It is possible that the contents of these fragments do not correspond with the fragments of the event as it happened in reality before it has been given shape in film-material; parts may have been shortened or condensed and others again may have been added. In professional terminology, a "découpage" process has taken place.

The contents of the separate fragments have been fixed on the celluloid (shooting process) by the aid of the camera and the microphone. For each fragment a separate shot has been necessary and each separate shot could be made different from the others (apart from the use of a special sound registration, special conditions of exposure, etc.) by the special position taken up for that purpose by the camera. The camera position includes the place where the camera stands at the moment the shots are taken, the distance of the camera from the facts and objects being shot, and the angle from which the shooting takes place. While taking shots, the camera can either be immovable or it may be moving; it may be quite near or far away from the facts and objects to be filmed; it may be held at eye-level or lower or higher; it may view the facts or subjects from below upwards or from above downwards; and, finally, the camera can be held in a straight, sloping, or oblique position.

The order in which the separate shots are joined together on the celluloid may, just like their contents, differ from the order of the fragments of the original event prior to the filming; changes may have occurred in the space-, time-, or causal-coherence of the fragments of that event. The process of joining the separate shots is called "montage" or "editing."

It now appears first of all that the use of the film medium implies a number of changes in the objective characteristics of space, time, and movement, and also in the space-, time-, and movement-

relations of the spectator. In other words, the space in which an action is localized and the space-relationship of the spectator to that action; the progress of time and the duration of the perception by the spectator; and, finally, the movement of the persons and objects in the film and the movement of the spectator in relation to these persons and objects—all this is radically changed by the use of the film medium.

The space in which the film event takes place is split up into fragments and is built up from fragments, whereas the place of action changes at regular intervals. The spectator on his part finds himself every moment in a different position of observation and, consequently, has mentally to move continually. Sometimes he is more or less a neutral spectator at the action of the film, sometimes he is involved in the action by a partial or complete space-optical identification with one or more of the actors in the film. Chronological order and the course of time are different from what they are in reality. Different happenings interrupt one another, time-spaces may be overbridged by intermediate pictures or "dissolves," and the duration of the time may either be compressed or extended.

As a result of all this the spectator lives in a time-situation which is different from the normal one. His perception-capacity frees itself from the ordinary time restrictions. He lives years in seconds, the past is made present and coincides with the moment on which he sees the film. Finally, the movements of the persons and objects in the film are governed by different laws than those of dynamica. The movements are either accelerated or slowed down, become rigid or can be analyzed in separate moments. And sometimes camera movements mean a quadrature of the movements of men and objects. The spectator is compelled to join in all these movements. While sitting quietly in his seat he inwardly changes from place to place as the film may demand and, virtually, he follows the leaps and movements of the camera.

III.

The practical application of the rich expression and communication-possibilities of the film medium gives a *double* meaning to this medium for educational purposes. As a means for the teacher to *teach* the film thereby becomes an instrument which is not merely suitable to make a certain subject matter outwardly visible, but which moreover makes it possible that the subject matter taught can be experienced and enjoyed in all its inward wealth. More-

over the film medium seen in this light forms an important means for the pupil to *learn* how to assimilate the subject matter.

If we try to find out what part visual language may play in the educational process, we may state in the first place that visual language is not so easily handled as word language. Even a highly developed technique is not likely to succeed in making the use of visual language in everyday life between persons very probable. This absence of the possibility of mutual use remains the greatest handicap of visual language as compared with word language, so that picture language offers no possibilities for a "conversation." Furthermore, it appears that visual language has no significance for giving names to objects perceived, but it may considerably enrich perception. It creates conditions of perception and means of perception which no other medium possesses. It enables us to make observations from all imaginable and normally-not-possible viewpoints; if so desired it extends or shortens the time of perception without detracting from the result of the perceptions; if necessary it changes the proportions of the visible, and makes visible what is usually invisible. It supplies to the imagination a wealth of new material and ordering principles; it helps the perceptive faculty to visualize in a concrete manner what without this visible language could not be visualized; it helps one to remember what by its aid has been perceived and it supports the reproductive capacity. Rational thinking—abstracting, understanding, judging, and deciding —will only be promoted by the visual language insofar as it may supply "material" for it. In itself a film-image and the combination of film-images possess only a small possibility for abstraction because the relationships and connections which they may express are always bound to the person of the spectator, the maker of the film, or the objects represented.

On the other hand, film language, by supplying thought-material may set the thinking process going, may remove impediments in the way of thinking, and may promote thinking so that the use of word language may even be furthered by it. Children whose thinking capacity has been impeded as a result of a shortage of ready-at-hand thought-material may sometimes succeed in expressing in word language a stream of thoughts after having seen a film. It does not even seem risky to propound the proposition that a new form of picture-thinking is developing alongside the rational way of thinking; not a picture-thinking in the ordinary sense of the word, which may even present a danger for word-thinking and may

hinder the unraveling, elucidating, fixing, analyzing, and objectivating of thoughts, but a thinking in visual language with unique plans and structures and a completely separate value for the mental development of the personality.

With regard to the emotional life and the will-life, visual language is inferior to word language insofar as it is not in a position to canalize and intellectualize emotions and endeavors in the same way as word language can do this. On the contrary, visual language will, to a high degree, bind its user affectively to objects and so will form a hinderance in the way of a correct critical evaluation of things. Visual language itself, however, can better than any other means of expression give shape to emotions and affections, thereby enabling the onlooker to experience emotions and affections, which he may not or may hardly be able to experience in another manner. Finally, the visual language may in certain cases be fruitful for a person's way of acting, as a means of preparation for actions of a not-too-complicated nature. Because it makes it possible for him to see objects and facts, their correctness, their value, their necessity, and their feasibility first in pictures, he may in advance imagine the actions to be performed.

IV

In making *educational* films only a very limited use has been made so far of the rich possibilities the film medium appears to possess. In fact, for educational purposes one uses film almost exclusively as an illustration medium, as a possibility to give a reproduction, which is as true to nature as possible, of things which cannot be brought into the school. This limitation of the possibilities for the use of film is on the one hand due to the lack of insight in the actual opportunities offered by the film medium by teachers and educational experts, while on the other hand it is the result of the lack of sufficient knowledge of film language by the pupils.

For, although film language is much easier to understand than word language, the youthful spectator has to learn to understand that language. As far as grown-ups and film-experienced spectators are concerned, the communication content of the film is immediately perceived or understood in the film-picture itself in exactly the same manner as the thoughts of a writer or speaker are immediately understood in a word or a sentence. The difference between reading a book and seeing a film is that in reading *we do* and in seeing a film

we don't realize the signs whereby the communciation content is symbolized.

As a rule, we no longer realize that the film-images are signs because we immediately recognize through these signs their actual meaning. Only when proceeding in an analytical manner, we discover that we have taken in the communication content by means of a number of various symbols. Not only the objective elements in the communication content are understood immediately but also the subjective elements, at least insofar as they refer to the physical relation of the maker of the film to the objects in the picture. The spectator immediately understands the optical-spacial relationship between the maker of the film and the object represented, because he finds himself to be in the same optical-spacial relationship as the maker of the film. Also, the objective elements consisting of the relationship between the pictures mutually—of succession, cause-result, subject-object, etc.—are immediately understood by the adult spectator with some film-experience because they are based on the same principles as those which construct the perception habits of the spectator. For also the ordinary perception lays certain connections between things which are perceived immediately after each other or alongside each other, whereby the question whether these relations are of a causal, temporal, or other nature is defined by the subject content and the relative context. Only in those cases where the sign-character of the film-image combination is not clearly evident—for instance, the dissolving into one another of two pictures in order to indicate a lapse of time—the understanding does not follow immediately from perception, but in that case the meaning has first to be learned.

But what has been said above concerning the direct intelligibility of the optical-spacial meaning in the film-image holds only insofar as the adult and film-experienced spectator is concerned. For the youthful and inexperienced spectators the understanding of film language presents a series of difficulties. It must not be forgotten that the new space-time and movement relations demand a certain adaptation from the spectator. Even the grown-up spectator, who seldom or never goes to a cinema, has great difficulty in understanding the film-images. Just like a child he has to learn to understand them.

The rough learning of a child between three and six years old (whereby the objects in the outside world are assimilated only in their vague totality and whereby only those details are learned

which obtain relief as a result of a very subjective interest or remembrance) does not agree very well with an already somewhat complicated use of film language. For children of that age a film should be little more than a simple reproduction of simple reality-contents, without changes in space, time, and movement occurring as a result of découpage, shooting, and editing. Between the ages of 6 and 12 the child begins to appreciate objects that are separate from him and, consequently, starts to discount his own perception-viewpoint into the perception of the objects. But even this objectiveness of his perceptions does not immediately remove the difficulties experienced in recognizing the film-picture as a picture of reality. The child has to learn to decipher this picture which does not offer to him the same space-experiences as reality itself and which lacks various other criteria necessary for construing the perception.

The child has to set his imagination to work to find a substitute for these missing criteria. Furthermore, in order to learn to understand the shifting to another place of the camera, he has to learn to put himself inwardly continually in another position of observation, to deplace himself and, virtually, to join in the leaps and movements of the camera. B. and R. Zazzo (4) have already proven that even children 10-12 years old are not always in a position to follow the actions of the camera. For instance, the process of the optical-spacial identification with one of the film actors often presents difficulties. It is not until puberty that the child gradually develops more or less the same methods of perception as grown-ups, and only then the film language possibilities can be applied in full, although a certain familiarization with and learning of the film language still remains necessary.

Although after one has learned to understand film language, the perceiving of the meaning of the communication content of a film no longer needs intellectual reflection, yet the activity of the imagination remains necessary. Contrary to intellectual reflection, this might be called a prae-logical activity and it might even be concluded that film language has been adapted to that prae-logical activity—yes, even that a film speaks the same language as the imagination: it still remains a form of mental activity.

Meanwhile the comprehending of the meaning and functions of the film content is something different from the perception of the film form, although the latter will help to establish the difficulty or the ease of the former. By hearing the words, "The sun rises in the

East and goes down in the West," I have merely identified these facts in their time-order but I have not explained their function, value, and meaning in the entirety of the reasoning which these words form merely a part. The latter I still have to comprehend. In other words, I have to compare these facts with reality; I have to fit them into other similar events; I have to "valuate" them; I must be able to see them as part of a total reasoning; and I must be able to fix the correct place of that part. For instance, a film scene in which a legal examination of witnesses takes place has been perceived when one can distill from the pictures shown that the judge has put certain questions to various persons consecutively; but it is possible that the intention of these questions, namely, to arrive by the hearing of these witnesses at a conclusion regarding the question whether the defendant is guilty or not guilty, has not been comprehended at all. One may also have no notion of the connection of this scene with the preceding and the ensuing scenes. Thus the comprehending is definitely an intellectual activity and demands from the spectator the necessary exertion. It is true, however, that the comprehending of the film content is faciliated by the perception of the form of the film because the form of the film transforms the spectator into an ideal observer; directs and concentrates his attention; elucidates relations, analyses, and syntheses as the content may demand.

V.

The greater the place that will be taken up by the visual element in instruction and education and also in the entire cultural life, the greater will be the necessity to familiarize youth with visual language. We have already pointed out that understanding visual language, perceiving through the means of visual language, the fertilization of visual language for the life of the imagination and for "thinking" in visual language *must* be learned through practice and experience. The great receptivity for what is communicated in visual language is not by itself bound to promote the unhampered and individual growing of the personality. It may even counteract that growth. For that reason, too, it is necessary that a child learn to adopt a positive attitude toward the visual element in culture.

For that reason there should be room in education for a didactics of seeing alongside the didactics of speaking, writing, reading, mathematics, drawing, etc. By teaching youth how to see,

they are being taught at the same time how to benefit by what culture wishes to impart to us in a visual manner. The positive development of visual education stands or falls with this development of "seeing."

At this moment we do not yet feel competent to give more than some general suggestions for such education toward seeing. We insist that the film medium has to be regarded as a sort of language, a visual language. The teaching of seeing means to us that the children are being taught the active and passive use of the visual language—the active use: that the pupil is taught to express himself in visual language; the passive use: that he learns to understand and conceive thought-matter expressed in visual language. By active use of visual language may also be understood *imagining* in visual language (i. e. in pictures) thought-content or, if necessary, the *drawing* in pictures or the writing down in visual symbols a train of thoughts. It is not necessary that the child himself learn to make films. The writing of scenarios might suffice, or the child may be taught to put in proper order a series of photos or drawings prepared in advance. Interesting experiments with children themselves writing out in picture form an episode from history have been carried out by F. Consitt (1) and by others. The results are indeed very remarkable. Another experimenter has taught the school children themselves to make short films.

More work has been done in the field of passive skill in the use of visual language. B. and R. Zazzo (4) have carried out experiments concerning the capacity of children to understand a film scene. Mary Field collected a series of data about the difficulties experienced by children in understanding a film (2). Lindsay (3) carried out an investigation—albeit with another aim than that of testing the passive "visual-language" skill—with regard to the ability of children to recount the content of an educational film again in word language. A more systematic investigation with this special object as its aim might perhaps yield interesting data in respect to educational tuition through vision.

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AUDIO-VISUAL EDUCATION IN URBAN SCHOOL SYSTEMS

•VICTOR O. HORNBOSTEL

This article is a digest of a report given at the DAVI national convention in Los Angeles in April. The address was entitled "A First Look at Findings of the NEA Survey of the Status of Audio-Visual Education in City and County School Systems." Victor Hornbostel is assistant director of the Research Division of the National Education Association and supervisor of the survey which is reported.

IN DECEMBER 1946, the NEA Research Division reported a survey of audio-visual education as it was in the 1945-46 school year. A current study surveys audio-visual education for the 1953-54 school year, eight years after the first survey.[1] Both of these studies were undertaken in cooperation with the Department of Audio-Visual Instruction, NEA.

The highlights of this survey are reported under five major topics. They are:

1. Administration of audio-visual education
2. Physical facilities, equipment, and materials
3. Utilization of audio-visual materials
4. Financial support for audio-visual education
5. Some problems in audio-visual education.

ADMINISTRATION OF AUDIO-VISUAL EDUCATION

Of 1310 reporting authorities, 27 percent indicated that their school system had a central department, division, or bureau of audio-visual education headed by a director. In 1946, formal departments were reported for only 16 percent of the urban school systems.

Fifty-one percent of the urban school systems reported central

[1] The final report of this survey is scheduled for publication on October 20, as the October 1955 *Research Bulletin*. The cost will be 50c.

coordination but not formal departments. The two classifications of central coordination make up 78 percent of those reporting; that leaves 22 percent not centrally coordinated.

To Whom Responsible

In 77 percent of the 976 centrally coordinated audio-visual programs, the director is immediately responsible to the superintendent of schools. There was a marked deviation from this pattern, however, in cities of 500,000 and over. In 80 percent of these cities the line of responsibility is to an associate superintendent of schools.

Time for the Job

In 20 percent of the centrally coordinated audio-visual programs, the director has full time for the job. On the opposite end of the time scale 63 percent of the directors have one-fourth or less of their time available for audio-visual education.

The full-time directors are concentrated in the large cities.

Reasons the Director Was Selected for the Job

Heading the list of reasons the director was selected for the job was that he had formal education in the audio-visual area. Following in close order were: this man had practical experience in audio-visual education; this man demonstrated competence as a classroom teacher in using audio-visual materials and equipment.

Services of the Central Organization

From a list of 20 possible services that might be rendered by the audio-visual program, these were the first five by decreasing order of frequency of mention. The department, division, or bureau obtains free and rental materials for classroom teachers upon request, keeps classroom teachers informed of available materials and new acquisitions, selects and arranges for purchase of audio-visual materials, consults with individual classroom teachers on use of audio-visual materials, and schedules operators and equipment for school use. Such services do not vary much in different sizes of cities, different types of organization, or from year to year.

Recommended Changes

This first main section of the survey closed with a question on the satisfactoriness of the administrative organization. It required a "Yes" or "No" answer. Only about half the replies were "Yes."

In general, this was true regardless of school district size or type of organization.

Those who replied "No" were offered an opportunity to recommend changes. The statements from those in centrally coordinated audio-visual programs and from those in the groups of 30,000 population and below called for "more time" to give to the program. Statements from school systems without central coordination called for central coordination far more often than any other request. From the 500,000 group, the leading recommendation was for better physical facilities such as classroom darkening.

PHYSICAL FACILITIES, EQUIPMENT, AND MATERIALS

School Plant Facilities

More than two-thirds of the urban school districts have audio-visual materials centers. However, about one-fourth of the reports showed no central facilities of any type. This lack did not show up in urban school districts in the two groups over 100,000 in population. It began to show up in the 30,000 population group and was increasingly prevalent until in the 2500 group, 45 percent of the systems showed this total lack.

Besides central office and physical plant facilities, adaptable instructional space is important to audio-visual programs. While school auditoriums continue to be used in audio-visual education, the program today appears to be concentrated in classrooms. The inquiry was directed at both elementary-school classrooms and secondary-school classrooms.

Elementary-school classrooms—Adaption of classrooms for use of projected materials was rated in terms of a three-degree scale of such considerations as room darkening, electrical outlets, and acoustics. The reporting authorities said only 25 percent of their elementary-school classrooms were "well-adapted," 41 percent of their elementary-school classrooms were "poorly adapted," and 34 percent of their elementary-school classrooms were "not adapted."

Secondary-school classrooms—The ratings of secondary-school classrooms fell about the same as those for elementary-school classrooms. There were, however, a few more, proportionately, rated "not adapted."

Audio-Visual Equipment

Since all types of equipment cannot be considered in this report, it is limited to several of the more popular items; sound projectors,

filmstrip projectors, radio receivers, and one important newcomer in any list of equipment, television receivers.

These are the items of equipment per 10,000 students enrolled for each of the two survey years:

Equipment item	*1946*	*1954*
Sound projectors	10	24
Slide and filmstrip projectors	13	36
Radio receivers	18	37
Television receivers	...	2

Audio-Visual Materials

This summary concentrates on only a few audio-visual materials of instruction: sound films, filmstrips, and disc recordings. One fact that immediately stands out is that where most types of audio-visual materials are primarily owned by school systems, in the case of sound films, they are primarily rented. For all districts as a whole about one-fourth of the films used are owned. The rental of sound films shows no decrease since 1946. In fact the proportion of rentals has increased from about 69 percent to 75 percent.

A second highlight in the area of materials is the mushrooming increase in the amounts of certain ones available to classroom teachers. Avaliable, in relation to materials, means both owned and rented in the 1946 survey and in the 1954 survey.

These are the items of materials per 10,000 students enrolled for each of the two years:

Materials item	*1946*	*1954*
Sound films (titles)	175	566
Filmstrips (titles)	208	800
Disc recordings	281	498

Evaluating Facilities, Equipment, and Materials

This second main topic of the survey closed with a request for a rating of the physical plant facilities, equipment and materials as to whether they were (a) above average, (b) satisfactory, or (c) below average.

Of 1291 ratings given, 28 percent were "above average," 46 percent were "satisfactory," and 26 percent were "below average." The number of "above average" ratings was lowest in school districts without central coordination and in the 2500 population group. The number of "above average" ratings was highest in the three groups of districts above 30,000 population.

Those who gave "below average" ratings were asked to recommend changes. Two-thirds of these recommendations were for "better adapted classrooms." This call came from all sizes of communities. "More adequate equipment" came next; "more adequate materials" followed equipment; and then came "better facilities for the materials center and related activities."

UTILIZATION OF AUDIO-VISUAL MATERIALS

Building coordinators are appointed in about three-fourths of the elementary schools and also of the secondary schools. While the prevalence of the practice of having building coordinators is encouraging, the time these people have for the job is discouraging as can be seen by these figures:

Amount of time	*Actual*	*Recommended*
No free time during school hours	32%	0%
Less than half time	58	77
Half but less than full	1	21
Miscellaneous amounts	9	2

Preservice and Inservice Education of Classroom Teachers

While most of us would probably agree that some education and experience in using audio-visual materals would be desirable when new classroom teachers are to be employed, this was a "required qualification" in only 8 percent of 1252 school systems. It was an "important qualification" in 20 percent. It was a "minor qualification" in 43 percent. It was "not considered" in 29 percent.

But here is some evidence that progress is being made in this problem of the education of classroom teachers in the use of audio-visual materials. For example, 85 percent of 951 reporting authorities said that recently employed classroom teachers are "considerably better prepared" in the use of audio-visual materials than the classroom teachers employed 10 years ago. Even when the period of time was reduced to five years ago, 63 percent of the reporting authorities said that the recently employed classroom teachers are "considerably better prepared."

Inservice education programs were available in 45 percent of the school districts in the 1953-54 school year. Proportionately, more districts with central coordination (48 percent) had inservice opportunities available than did districts with no central coordination (33 percent) of audio-visual services. Such educational op-

portunities were relatively more available in the larger cities than in the smaller cities.

Frequency and Area of Use of Audio-Visual Materials

All evidence indicates that more and more classroom teachers are using audio-visual materials in teaching children. This is true of elementary-school teachers and to a lesser degree of secondary-school teachers.

In elementary schools—On the average, reporting authorities indicate that about 35 percent of their elementary-school classroom teachers use motion pictures at least once a week. On the other hand and at the other end of the use scale, there remains an estimated 12 percent who never use motion pictures.

The pattern of usage of filmstrips and materials that are primarily audio was about the same as for motion pictures. The pattern of usage of community resources in the classroom in 1954 was about at the same place that motion pictures were in 1946.

In secondary schools—Apparently secondary-school classroom teachers do not make the use of motion pictures and other audio-visual materials that elementary-school classroom teachers do. In considering motion pictures alone, 25 percent of the secondary-school teachers were estimated to be using them at least once a week, and 19 percent were reported to be nonusers.

FINANCIAL SUPPORT FOR AUDIO-VISUAL EDUCATION

Financial support is reported in terms of the budgeted amount of public funds for audio-visual materials and equipment, *exclusive of salaries*. The figures are in terms of money per child enrolled:

Reference point	*1945-46*	*1953-54*
Upper quartile	$ .60	$1.06
Median	.33	.65
Lower quartile	.14	.33

SOME PROBLEMS IN AUDIO-VISUAL EDUCATION

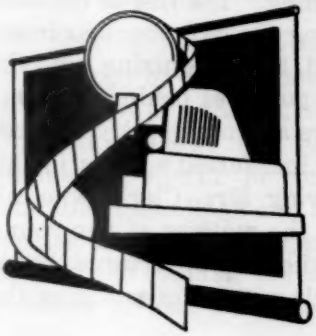
An even half of the reporting authorities said they were not faced with serious barriers to the effective use of audio-visual materials. The other half reported that their problems were serious.

Heading the list of obstacles was the observation that classroom teachers as a whole are not interested in using audio-visual materials. Sufficient funds ranked second in frequency of mention, and lack of central coordination or ineffective coordination ranked third.

SUMMARY IMPRESSIONS

In some ways, this report shows progress in audio-visual education. The work is being headed up by more widespread adoption of central coordination, more classroom teachers are prepared to use audio-visual materials in their classes, and there is more widespread use of the materials.

On the other hand, there are some urgent needs that become so evident from these data. "More time" is the need, "more central coordination" is the need, "more adapted classrooms" is the need, and separately and behind all these is the need for "better support."



FILM

•ROBERT W. WAGNER

FILMS ABOUT COMMUNICATION

As the study of "Communication" becomes formalized in high school courses, college seminars, and institutes for the training of leaders in business and industry, producers of educational films will find a growing market in this field.

The result will undoubtedly be a whole cycle of films on how to get ideas across, information theory, and the role of the mass media in society. The cycle, in fact, has already begun. Several films on various aspects of the subject are presently available which, although they constitute a satisfactory beginning, will probably seem elementary compared to those which may be expected a few years hence.

Making Yourself Understood[1] is a simple and straightforward exposition apparently derived from Lasswell's description of the process of communication.[2] The proposition stated by this film is:

> Every communication situation has these elements—the communicator, or person doing the talking, the content of his message, the medium or method of communication he is using, the audience to whom he is speaking, and the response the audience is making to his message. . . . In any situation we may ask, who is saying what, to whom, with what effect. . . . Knowing the answers to these

[1] Encyclopaedia Britannica Films. 14 minutes, black and white, sound. Collaborator: John Gray, PhD. Teachers College, Columbia University. Producer: John Bobbitt.

[2] Lasswell, Harold D. "The Structure and Function of Communication in Society." *The Communication of Ideas.* Lyman Bryson, editor. New York: Harper and Brothers, 1948, p. 37-51.

Robert W. Wagner is associate professor of Motion Picture Production, Department of Photography, The Ohio State University.

questions helps us to act more effectively in any situation either as the communicator or as the audience.

The role of the communicator —traffic policeman, salesgirl, actor, lover, television newcaster—is shown as an attempt to "get the other fellow to think, or feel, or do something." The role of the communicatee is described as one of evaluating the daily bombardment of communiques to which he is subjected, by recognizing who the communicators are and by analyzing the purposes behind their appeals. Only in this way, it is argued, can we act intelligently towards those who would try to influence us. Our indifferent success in this effort is symbolized in a sequence involving Mrs. Clark, who, although she is able to detect and evaluate the motives of her young son who is trying to get the family car for the evening, accepts the information contained in a newspaper article without questioning the source.

Language, written and spoken, is identified as the principal tool of communication. The difficulties the communicator has with words and statements are attributed to the emotional context and backgrounds of the individual reader or listener. As an example, a teen-ager hesitates to go to a private college when he finds out that "rich kids" go there. Two businessmen react in different ways when a political candidate refers to himself as a "friend of labor."

Illustrating the differences in audiences, a physician is shown successfully communicating with a patient by telling him he has a bad case of "athlete's foot." Later, in commenting to a colleague, the doctor finds it more effective to refer to it as a case "epidermophytosis." In another sequence showing how a mother manipulates her quarreling teen-age children into silence, the film comments, "We can generally get a more favorable response to an idea if we use words and statements having the right appeal."

This point is further illustrated by the agent for a community fund who, when asking a business colleague for a donation, appeals to the latter's self-esteem and civic pride. In approaching a garage mechanic, however, the solicitor bases his appeal on the laboring man's knowledge of what it means to be out of a job, and on the desirability of giving the other fellow a break.

The importance of the right situation and the right medium in successful communication, although mentioned, is brushed off too lightly. The element of response or feedback also fails to receive adequate attention as the film hurries to a close with the thought:

Whatever medium we use, and whatever audiences we reach, the questions to ask are the same. Who is talking? What is he saying? What medium of communication is he using? To whom is he speaking? What response is he getting? The answers to these questions are the guideposts to effective communication. They help us to that understanding of one another that is essential for successful living and working together.

Making Yourself Understood is useful as a broad introduction to the study of communication. In dealing with the specific elements of the Lasswell analysis, the film, due to its brevity, over-generalizes. But it does show, in a series of rather short but well-chosen examples, the role of the communicator as he strives to develop common understandings and acceptance, and it shows how the communicatee can react intelligently to some kinds of messages only when he learns to evaluate the intent of the communicator and only as he develops greater understanding of the whole process of communication.

A Communications Primer[3] must be considered the first significant film in the field of information theory, both because of its content and because of its cinematic qualities. Its announced intention is "to open some doors to the many and various aspects of the subject of communication which are becoming increasingly important to all of us." Although it "does not pretend to teach the subject," the hope is "that seeing it will help discourage ever thinking of communication in a limited way."

The film was produced by Charles and Ray Eames. The former, noted primarily as a furniture and industrial designer, was responsible for the writing, photography, direction, editing, and sound dubbing. The content reflects the thinking of Claude Shannon,[4] Warren Weaver, and Norbert Weiner,[5] whose statistical analyses of the communication problem opened new territory in information theory and cybernetics.

Shannon's diagram of the process of communication is used as a referent throughout the film, as the meaning and function of (a) the information source, (b) transmitter, (c) signal, (d) receiver, and (e) destination are illustrated in turn. "The brain," says the narrator, "is usually the information source. From it the message is

[3] Available on a rental basis @$12.50 from the Museum of Modern Art Library, 11 West 53rd St., N.Y. 16, N.Y., and from the University of California Film Library, 405 Hilgard Ave., Los Angeles 24, California. Available on a life-lease purchase basis at $200. from Cine Service, 1350 Westwood Boulevard, Los Angeles, California, from which purchase and preview prints may also be secured.

[4] Shannon, Claude E., and Weaver, Warren. *A Mathematical Theory of Communication.* Urbana: University of Illinois Press, 1947.

[5] Weiner, Norbert. *Cybernetics.* New York: John Wiley and Sons, 1948.

selected. The vocal cords are the transmitter. Sound is the signal. The ear and the associated eighth nerve is the receiver."

Each act, it is explained, can be broken down into individual decisive units—"go or no go; black or white; fire or no fire; on or off." A black and white halftone is shown as composed of some half-million points of decision, or "bits" of information. A Renoir painting is broken down to show how innumerable points of decision go to make up the whole. The proposition is then stated that "as theories, and equipment, and men develop, it becomes apparent that one sure way of handling multiple factors is to build a system that can handle each decision in its time."

The whole field of cybernetics is touched upon in a sequence on the sorting, storing, manipulating, and calculating ability of machines in which we hear the sound of an electronic brain as it goes about its "decision-making" functions.

In the loose use of terms like "mind," "brain," and "experience," the film at first suggests an almost wholly mechanistic interpretation of behavior, an impression which is further reinforced by cybernetic comparisons of electric calculators and human beings. But the film makers eventually point out that the machine can never relieve the man of the responsibility of decision. In the words of the narrator:

> The greatest fallacy in the comparison is one of degree. The decisions made in the machine are comparable to the million made in this halftone. But far greater is the number of stops and goes performed by the human nervous system in order to complete the simplest act. So great that if each decision were represented by a small half-tone dot, the total area of dots would cover several earths. Such is the magnitude we reach when a number like a half million is raised to the fourth power.

The organic nature and complexity of the communication process is further suggested by scenes of a flock of birds in flight followed by a dissolve into a crowd of people merging and passing at a street intersection. The narration which accompanies this combination of shots goes like this:

> When we watch them turning and wheeling, how often have we wondered what holds such birds together in their flight. Communication is that which links any organism together. It is communication that keeps the society together. And though these people seem unaware of each other's existence, neither looking nor speaking, one group meets and passes through the other with hardly two individuals coming in contact—so constant is the flow of information and so complex the web of communication that keeps them apart and holds them together.

There is much food for thought in this film, including a number

of interesting philosophical implications, some good illustrative material on the concept of "noise" in a communication system, and provocative photographic symbolism far above the power of words to add or detract. There are points, however, where the effects seem to overpower the message, and where sheer cinematic virtuosity may, in fact, become "noise." In still other places, where the abstraction becomes too difficult to symbolize, the screen image is relatively static while the sound track lectures. Nevertheless, this is a treatment of information theory full of rich discussion possibilities, and one which needs and merits both repeated showing and critical analysis.

Bridges For Ideas[6] is an example of how a number of related disciplines might be coordinated in a concerted attack upon some of the problems of communication. It shows how, at the University of Southern California, the departments of education, cinema, radio and television, fine arts, and English provide a background for Tommy, a student who:

> . . . lives in a world with people. And those people are always trying to do something. Each has his dreams, his faults. But to act, to dream, to solve their problems, people must communicate with other people. And in this modern world, people must receive and act upon millions of separate messages from the outside—messages that come in over bridges, over bridges of film and paper and electrons—bridges for ideas.

The film illustrates the point that even simple directions are sometimes hard to communicate, although this point becomes labored in the form of a running gag as we see a lost Chinese student trying to get directions to a campus building and winding up in the middle of an open field.

Tommy, the central character, too, is lost somewhere in the structure of the film. But in the interim we see a rich variety of resources and materials which are now at the disposal of the professional communicator of ideas.

As in *A Communications Primer*, *Bridges For Ideas* tends, at certain points, to indulge in technique at the expense of the main idea. For example, a montage of audio-visual equipment from tachistoscope to television moves too fast and is perhaps too skilfully designed for visual effect to be grasped and understood by those not familiar with technical devices such as the visual-cast and the continuous motion picture printer.

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[6] Produced by the Department of Cinema, in cooperation with the Department of Radio and Television and the School of Education at the University of Southern California. Written and produced by William Mehring. Collaborators Lester F. Beck, James Finn. 24 minutes, black and white, sound. (1951) Sale: $75. Rental: $2.50.

However, the thing that makes this picture valuable, along with those already mentioned on the subject of communication, is its central reference to the need for an interdisciplinary approach and its placing squarely on the doorstep of the American university the challenge to help solve the problem of communication in a troubled world.

Accent On Learning[7] adds another side to the many-faceted concept of communication by bringing the problem down to the face-to-face level of the college classroom. It reflects the viewpoint of educators in the audio-visual field and attempts to show how a series of specific teaching problems in the fields of engineering, geography, fine arts, medicine, accounting, and political science were solved by the use of sound teaching methods, including the application of a variety of audio-visual materials and techniques.

This film was produced at the instigation of the Audio-Visual Materials Committee at the Ohio State University. Its intended audience is the college and university instructor. Its purpose is to develop the concept of the teacher as a communicator of ideas.

In the future, we shall see more films which, like *Making Yourself Understood*, outline the communication problem in its essential form. We shall also have films which, like *A Communications Primer*, deal not only with pure information theory, but also with individual elements of that theory. It is reported that Eames, for example, is presently at work on a picture to be titled *Feedback*. We shall undoubtedly also find more films, such as *Bridges For Ideas*, which expand the interdisciplinary aspects of the subject, and still others, like *Accent On Learning*, which apply communication theory to specific problems of family life, business, government, industry, education, and other fields.

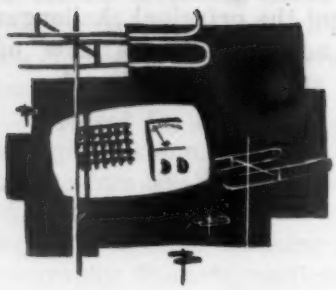
No doubt we shall also have films which take even different approaches. Dallas Smythe's remarks in an earlier issue of the *Audio-Visual Communication Review*,[8] for example, suggest David Riesman's *The Lonely Crowd* as material for a significant film on the evolution and meaning of communication in relation to the shifting social, economic, and technological scene. There will be films which present the specific problems involved in "getting into the other fellow's shoes." And we must have films which present the problem of the meaning of what is communicated and the responsibilities of

[7] Produced by the Department of Photography, The Ohio State University. Written and directed by Robert W. Wagner. Colloborators: Edgar Dale, Norman Woelfel. 30 minutes, black and white, sound. (1949) Sale: $75.

[8] Smythe, Dallas W. "Some Observations On Communications Theory." *The Audio-Visual Communication Review* 2: 30-35; No. 2, Winter 1954.

the communicator for the bits of information, however coded, which he successfully transmits.

Such films will be hard to make. But if honestly and skilfully produced, they will be films which present the principal challenges of our times, since they will have to deal not only with the "how" of communication, but also with the "why" and the "wherefore."



TELEVISION

•DALLAS W. SMYTHE

TV PROGRAMS WE HAVEN'T SEEN

I.

Several years ago Marya Mannes, TV critic for *The Reporter*, remarked: "What one university accomplishes this year on its channel, three more will attempt next year. Know-how will develop with experience." Experience of this kind to be useful must be shared experience—shared between those who are concerned with the development of the art of using TV for education. The present remarks are intended to identify and explore two dimensions of such experience. The first is the process for sharing experience in the use of TV. And the second is the much larger issue of the possible but as yet undeveloped programs which *might* be developed for the educational use of TV.

The process of sharing experience in programming TV for educational purposes must be placed in perspective. Today some 13 educational TV stations offer programs to a theoretical maximum audience of about 18,000,000. This represents tremendous growth as a result of herculean efforts over a period of less than five years. Beginning with the necessity to obtain reservation of TV channel assignments for educational institutions, this growth represents a large measure of success on other fronts. It has been necessary to develop an understanding of the rationale for educational TV among opinion leaders in scores of communities. Educational administrators have had to learn the facts of life concerning TV and their bearing on traditional concepts of in-school and adult education. Similarly, all concerned with the development of educational

Dallas W. Smythe is research professor in the Institute of Communications Research and professor of Economics at the University of Illinois.

TV have been brought in contact with the realities of our national TV policy as it involves the national government, the commercial TV industry, and political party considerations. Engineering knowledge has had to be focussed on the specific problems of educational TV. And, probably most significant as a limiting factor on the pace of progress, personnel capable of planning, supervising, and operating educational TV stations have had to be acquired somehow—by training or by transfer from related work. That 13 educational TV stations are now on the air is remarkable not for the fewness of stations, nor the inadequacies of their programs, but because so many are on the air and so many more are at various stages of progress toward that objective.

An understanding of the process of sharing experience in educational TV programming requires recognition of still another dimension. Educational TV programming exists in a matrix of cultural industry. While the radio, motion pictures, and other media of communication are important in this connection, commercial TV exerts the predominant influence. Commercial TV stations outnumber educational TV stations more than 10 to 1 and will continue to be more numerous. Commercial station programs reach a potential audience at least five times as large as that of the educational stations and hold this audience attention for an average of five hours a day. Most important for anyone desiring to review the condition of educational TV programming, commercial TV surrounds it with glamour, glitter, and its own unique aesthetic standards. Deeply ingrained in commercial TV programming is the assumption that the star system and lavish production values are the backbone of the art of TV. Yet in its own programs, commercial TV departs from this formula often enough to provide educators with tantalizing glimpses of possible program innovations.

In this context, we should approach the problem of sharing experience in programming educational TV stations with an indulgent attitude toward its shortcomings. However, if Napoleon was correct in asserting that an army marches on its stomach, it is no less true that educational TV lives—or dies—by its programming. For without programs adequate to its potential, the building of stations will go almost for naught, as so clearly was the case with educational radio in the 1920's through the 1940's.

II.

What is now done about sharing experience in educational TV programming? The Educational Television and Radio Center,

established by the Fund for Adult Education at Ann Arbor, Michigan, serves a program exchange function for a growing number of hours per week (at present six and a half) for the use of educational stations. In making grants for the production of programs, the Center also inevitably directs the course of program innovation through its choice of producers, writers, and program ideas to receive such grants. Apart from the Center, a large number of organizations perform the more peripheral function of circulating information and critical appreciation of programs of educational stations. Most obvious among these are the Joint Committee on Educational Television and the National Association of Educational Broadcasters. The JCET, which is essentially a meeting place for the heads of educational associations of nation-wide scope, has offered from its headquarters staff assistance in making program plans. Possibly of more effect has been its regular publication and distribution to interested groups of current news of program developments, condensed program logs of existing educational TV stations, and the like. The JCET has also participated in a large number of conferences and conventions for the purpose of advancing the cause of educational television. It reported last year that some 41 national associations (including such diverse groups as the American Speech Association, the American Association of Colleges of Pharmacy, and the Boy Scouts of America) had scheduled educational television for their convention agendas. Presumably, program content had some degree of special consideration in many of these discussions. A second organization has been the National Citizens Committee for Educational Television which has also stimulated interest in possible educational TV programs through its promotional work among civic groups.

The National Association of Educational Broadcasters has dealt with the problems of educational programming in various ways. Its annual conventions have included discussions and demonstrations of programs. It has conducted two-week workshops where the rudiments of the actual art of programming could at least be taught to people who might staff educational stations. It publishes a monthly newsletter which informs stations or stations-to-be of major current developments affecting their program plans. And recently, the NAEB has created a TV Program Planning Committee which serves in an advisory capacity to the Educational TV and Radio Center. Standing behind these operations have been a num-

ber of foundations which have expressed their interest in and support of educational TV by contributing some $10 million to it.

The question inevitably arises whether this impressive array of activities is indeed adequate to perform the sharing of experience function which is so necessary to the development of a new art. At best, this is a difficult function to perform. It involves much more than merely the screening of kinescopes or films. The time required for this alone is a sizeable barrier. We sometimes wonder how much of the talking about programs would be rendered unnecessary if the talkers took time to watch more programs before starting to talk. This problem of time for viewing programs is most acute when programs are screened at conventions or meetings where the compulsion to talk with friends and acquaintances is particularly strong.

Sharing of program experience also means evaluating the program in its policy and audience context. What was the avowed purpose in broadcasting the particular program at the particular time? What assumptions were made concerning the nature and size of audience? And so on. Before the program experience can be shared, i. e., made use of by another station, there needs to be a matching of policy considerations and of descriptive information, and an evaluation of the program material in the light of the comparative contexts in which it might be employed by more than one station.

"Sharing" of program skills implies both production as well as borrowing of program materials. A station which leans too heavily on programs borrowed from other stations can hardly serve the needs of its viewing community. As anything beyond a stop-gap measure pending the development of its own program-producing facilities, heavy reliance on borrowed material is indefensible. And a review of the program schedules of the educational stations on the air suggests that the sharing of program skills may in fact be inadequate in this respect.

The value of sharing experience in programming must necessarily depend ultimately on the value of the experience to be shared. And ultimately the value of the experience of educational broadcasters depends on their own standards of programming. Granting, as we must, that in the short run educational television will use what personnel are readily available, the standards of programming are thus seen to depend on the maturity, integrity, courage, and skills of the personnel—both the program staff and those who occupy the

policy-making posts in educational television. Of the two sorts of personnel, it is the administrators whose policies make possible and defend programming consistent with the ideals of educational TV. It should be admitted that quality of the administrative personnel is a severe limiting factor in the development of educational television programming. It could hardly be contended that before TV the best equipped educators in our educational institutions were the individuals responsible for running the educational radio stations. And yet the central corps of administrators of our educational TV stations consists of these same individuals. As the possible paramount role of the TV station in the educational institution in both education and public relations becomes increasingly appreciated by the institutions, we may expect to find more able administrators for educational TV. And as time permits the recruitment and training of new men and women, this limitation on the potential of TV programming will be eased. Meanwhile, we may hope that creative drive of the writers, directors, and producers of TV programs will develop more and more programs of a quality which will lead the educational stations towad standards consistent with the glittering promises made on behalf ef educational TV during its promotional phase. It is this potential of the creative people to which we turn now.

III

Is it possible to surmise with any degree of confidence as to what the character of "new" TV programming will be? Can we anticipate the nature of TV programs we haven't seen which will realize the potential expected of educational TV? What are the guideposts on the way toward educational TV "know-how"?

In all candor, what qualifications do we have for trying to answer such difficult questions? We have never run a station or produced a hit program. We have not watched all the programs now being telecast by the 13 educational stations on the air or even a representative sample of these programs. We have not had the opportunity to analyze the scripts of such a sample of programs. On what, then, can we base remarks on this topic? We have watched a few programs from educational stations (the University of Illinois station is not yet on the air). We have observed and analyzed a much larger number of programs from commercial stations during the course of conducting a number of content analyses on behalf of the Fund for Adult Education, and in connection with other studies

of TV content and effects. And we have tried to inform ourselves concerning the aesthetic issues involved in the question.

There can only be *new* educational TV programs of lasting significance to the extent that already established principles of aesthetics are more completely applied and interpreted than they have been in the use of the unique possibilities of the art of television. The central aesthetic principle in our view of the art may be called validity. This means that the communication is such that the viewer uses it to support or stimulate his realization of the meaningfulness of life. "Meaningfulness of life" in this context has various synonyms or perhaps dimensions, such as truth, beauty, dignity, integrity, and love-of-fellowmen.

This conception of the art of TV programming rests on the dynamics of viewing and listening. We know that viewers bring to the act of viewing their own needs—needs for ego-support, for relief from anxious tension, for affection and emotional warmth, etc. We know that they literally take the program material and remold it to fit these needs. And this psychology of the perception of an art form is consistent with the view of aestheticians. Thus, Gotshalk in *Art and the Social Order* emphasizes that an aesthetic experience is an *active* effort by the viewer in which he molds himself in accordance with the material perceived.

To state this validity principle might seem trite and axiomatic were it not for the apparent confusion in discussions of educational TV programs. Something like a ritualistic dance is often performed. One part is played by those who justify the formula-star-studded programs as being necessary to attract the "mass" audience. Another part is played by those who infer from the former that "educational" programs must therefore be any program which gratifies any needs of the "minority" audience which is not shared by the "mass" audience tastes. The partnership between these two is sealed when the first party announces that all programs are educational because little bits of the "higher culture" in the form of isolated arias from opera, brief ballet excerpts from "Swan Lake," etc., are smuggled into the "mass audience" programs much as dimes used to be hidden in the child's birthday cake. This pseudo-aesthetic rationale is, of course, quite irrelevant to the aesthetic principle of validity stated above. Worse, the ritualistic "act" obscures the real issues involved in educational policy formation for television.

The validity principle has several significant implications, most

obvious among which is the relation of the potential art of television to the standards of commercial TV programs. Like its fellows, radio and motion pictures, commercial TV programming is dominated by the star system and the assumption that the more expensive gimmicks are crammed into a program, the better it is. Compulsive imitation by one producer of such values in preceding commercial programs makes up what Allan Chase calls the "Chicken Little Syndrome." To the extent that commercial TV adheres to this formula, its programs are distinguished chiefly by their devotion to clichés, type-casting, and the stereotyping of format, content, and characters in two-dimensional terms. To this extent, validity is conspicuously absent from commercial TV programming.

Thus far, our argument is far from original. The same point has been made by Seldes, Siepmann, and others. It is unfair and unrealistic to leave it at this point, however. Many and perhaps most writers, directors, and producers in commercial TV are quite aware of all this and would like to escape from the hamstringing influence of the Chicken Little Syndrome. Occasionally, when the compulsive enforcers of that Syndrome (the advertising agencies, the talent agencies, the network management, and the advertisers) permit deviations from it, commercial TV demonstrates the potential of validity in TV. As an example, consider "Marty." It featured no "star," and was cast with little-known actors. It was certainly cheaply produced. Its story was a departure from formula. Rather than the stereotyped plot of glamorous boy meets glamorous girl, Marty is about two homely people—a fat man and a skinny girl—whose problem is that of most Americans—loneliness and a need for self-realization. And the writing was an example of the sheer delight which can be experienced by an audience when the salient features of actual conversation are skillfully combined in dramatic dialogue. In this connection, note the amused recognition of yourself which is aroused by the apparently aimless repetition of "What shall we do tonight, Angie—got any ideas?" "I dunno, Marty (pause while looking blankly into space)—you got any ideas?" Also note the adolescent man-talk about Mickey Spillane and the girlie magazines. Nor is the validity of "Marty" limited to the obvious romantic relation of Marty and the girl. That relation exists in a context which emphatically states the tragic problem of parents facing old age resourceless after their children marry.

We emphasize "Marty" here for several reasons. Not only does it illustrate the importance of escaping from the Chicken Little

Syndrome, but it also illustrates another point which is as yet too little understood by people concerned with educational television. Calling a program educational doesn't make it so. And, *per contra*, a program which was ostensibly designed as entertainment as was "Marty" may convey more "education" about the problems of anomie and old age than a static, didactic "discussion program" involving several individuals and a chairman all uncomfortably seated before an obviously phony living room set.

A few national advertisers provide a conspicuous example of the importance of programming TV with valid material. The Dupont Company and the Aluminum Company of America through their support of the "Cavalcade of America," Ed Murrow's "See it now," and the United States Steel Corporation through its "United States Steel Hour" have developed experience which ought to be shared more fully by both commercial and educational stations. In these cases the programs usually have been conceived in valid terms; they have explored the unique potential of TV for educational purposes. Nor are these programs the only ones which might be mentioned.

Why aren't there more programs of this order? The answer is to be found in the economics of program production and in the Chicken Little Syndrome. Production costs of commercial TV are high and will rise higher, especially as color programs become more common. Boards of directors concerned with profits too often fall into the error of underestimating both the public taste and the value of the institutional advertising which such programs have for them. In the relatively competitive fields of cereals, drugs, and cigarettes, a cheap formula program built around a star may appear to pay off in terms of increased product sales. Advertisers in less traditionally competitive fields should realize that "no price can measure the value" of the favorable public opinion developed by their more expensive but more humanly meaningful TV programs.

A second implication of the aesthetic principle of TV relates to what we might call the bias of technology. In the early stages of the development of a new art which is made possible by highly elaborate and novel technology, it is understandable that there is some program interest in the technology for its own sake. People like to be shown how TV works and how their friends or townspeople look on the screen. The writers, directors, and producers also should be indulged in a period of exploration of the technical possibilities of TV equipment. But this phase should pass in favor of content which is humanly, rather than technically oriented. In our

culture, however, technique is a constant fetish and there are powerful cultural forces which restrain us to subordination of the human to the technical. Related to this technical orientation of TV programs is the predilection for programming *events* rather than *ideas*. "Events" are traditionally a prime concern of the press and a powerful tradition enforces them as the backbone of news and public issues programming on television. And "events" in a technologically oriented culture such as ours tend to be technologically oriented themselves. Our contention is that this technological bias toward events diverts and beclouds public attention from the most significant issues facing us. In a world torn by a conflict of ideas embodied in politico-economic systems, mutual understanding and human survival itself depend on addressing our attention to ideas more than to the events which are, after all, symptomatic rather than primary in significance. Ultimately, politico-economic systems like technologies can be justified only as they serve the needs of mankind. It will probably help to create valid TV programs if creative talent holds firmly to the belief that man developed technology and politico-economic systems to serve his needs rather than the reverse.

BOOK REVIEWS

ALLPORT, FLOYD H. *Theories of Perception and the Concept of Structure.* New York: John Wiley & Sons, 1955. 709 p.

Reviewed by

FRANKLIN FEARING

Kurt Koffka's question, "Why do things look as they do?" states the problem, although in a much simplified form, with which Professor Allport's book is concerned. In seeking the answer or answers the author undertakes the monumental task of assembling, codifying, and evaluating the theories of perception and the various lines of evidence which support them. This critique—a work of impressive scholarship—serves as a kind of introduction to the statement of the author's own "event-structure" theory of perception. Within the limits of a brief review it is impossible to do more than outline these critiques, and indicate some of the important aspects of the author's own theory.

In the first three chapters the author establishes his criteria for theory evaluation, and describes the phenomena and states the problem of perception. Before making a formal statement of the problem Professor Allport undertakes a careful examination of the criteria for objectivity in science. The physical and natural sciences, he notes, may take objectivity for granted. But for the psychologist and particularly the psychologist studying perception, there exists a special problem and obligation not shared by the physicist and biologist. The psychologist's task is not merely to observe objects and events considered as existing independently of the observer, but is also concerned with how the world of objects and events look to the perceiver. In the author's words the psychologist "does not merely observe; he observes the observer." With the specific criteria

Franklin Fearing is professor of psychology, University of California, Los Angeles.

for objectivity established, the basic distinction between physicalistic and phenomenalistic experience can be made.

It is at this point, of course, that the study of perception really begins. If phenomenology is abandoned we no longer have to bother with Koffka's question, or, at least, we should have quite a different answer. But Professor Allport does not abandon it, and in dealing with its relation to physicalistic experience the author discusses the tests for veridical and non-veridical perception, the problem of meaning (later called the "unsolved" problem of meaning), and the methodology of operationism. The problem that is raised here, of course, has a long history in psychology. Professor Allport adopts a parallelistic position, although he feels that an adequate theory of perception must have its primary basis in the physiological rather than phenomenological realm.

The phenomena of perception themselves are grouped in six broad classes. These are the sensory qualities and dimensions, configurations (figure-ground, "wholeness"), the constancies, the frame-of-reference phenomena, concrete object-character, and the effects of set or state. Having laid the groundwork, the author devotes some 17 chapters—roughly three-fourths of the book—to a critical examination of the current major theories of perception. Each is appraised in the light of the methodological criteria established in the first chapters, and the data supporting each are carefully evaluated. Although in some respects this critique is the heart of the book, and certainly a massive achievement in scholarship, space will permit only a listing of the thirteen types of theory which are examined. Using the author's designations, these are:

1. Core-context theory (Titchener, Boring, as allied to the "classical" theories of the Associationists)
2. Gestalt
3. Topological field-theory (Lewin)
4. Cell-Assembly theory (Hebb)
5. Sensory-Tonic theory (Werner and Wapner)
6. Motor adjustment theory (Freeman)
7. Adaptation-Level theory (Helson)
8. Probabilistic functionalism (Brunswik)
9. Transactional functionalism (Ittelson, Ames)
10. Directive state theory (Brunner, Postman)
11. Hypotheses theory (Brunner, Postman, a reformulation of the directive state theory)
12. Behavior theory (Hull)
13. Cybernetics

There follows a long and brilliant chapter in which these theories are summarized in terms of the answers they give to nine critical questions. Divergencies, and especially the aspects common to all the theories, are presented. Finally, as regards the possibility of a synthesis the author finds there is a general consensus that the perceptual aggregate is in the nature of a "dynamically operating *structure*." Since this is a key concept in Professor Allport's own theory his characterization should be quoted. It is "conceived as composed of interrelated and interdependent parts, . . . assembled in space and through time, and . . . is self-delimited and self-closed in its ongoings or operations. In its action, like all systems that have a give and take of energies with the outside, it either departs from and returns to energic equilibrium or it maintains a steady state; and in so doing it manifests an operant energy-ratio or weighting among its parts, a summing or averaging of their energies, a flexibility, and yet a stability of certain inner relationships or proportions."

The last chapter is devoted to a more detailed exposition of the event-structure theory of which only the briefest summary can be given here. "Ongoing processes" and "events" are the key terms in Professor Allport's theoretical model. Ongoing processes are motions in space and time such as neural impulses or muscular contractions. Events are the junction points that link ongoing processes—when, for example, a receptor is stimulated by external energies, or when one neuron fires another. They are points at which an "encounter" occurs between "ongoings." Further, these patterns or structures of "ongoing events" are conceived to operate in a cyclical fashion. Such a cycle can be terminated in the region from which it starts or may repeat itself indefinitely. These cycles may be compounded in various ways, and higher order-structures are made up of cycles of cycles. Basic to the understanding of all of Professor Allport's theorizing is the conception that the laws of nature require two kinds of statements. One type of law is concerned with quantities or dimensions, the other deals with structures which require non-quantitative descriptions. Structures must in the first instance be considered in complete independence of all quantitative considerations.

It will probably be a long time before we have as comprehensive and thoughtful a review of the phenomena and theories of perception. But regarding Professor Allport's general theoretical orientation, in so far as he understands it, this reviewer is not so sure. He has difficulty, for example, in finding denotational equivalents for

such conceptions as "dynamically operating structures" which exhibit a "geometry of dynamic self-closedness," since Professor Allport is careful to insist that he is *not* referring to structures composed of anatomical units such as receptors, neurons, or muscles. A related difficulty is concerned with the hypothesized connection between the physicalistic and phenomenalistic realms of experience. A satisfactory theory of perception, according to Professor Allport, "must carry on a large part of its work of explanation in the physiological rather than the phenomenological realm." How large a part? One is to conclude, it may be supposed, that the dynamically operating structures are physiological, that is, physicalistic. What, then, becomes of the phenomenology of perception?

We must recognize the fact that the phenomenology of perception is determined in part by cultural factors in which language plays an extremely important, perhaps primary role—a point which is particularly important to social psychology. Here, as elsewhere, the tests for veridicality of perception are to be applied. "Veridical perception," says Professor Allport, "free from influence or alteration by cultural norms or social fields (even though supplemented by them), and the physiological structures by which such perceptions are accomplished are therefore just as much the business of the social psychologist as of the autochthonous laboratory worker." But *is* veridical perception ever completely "free from influence or alteration by cultural norms"? What test of veridicality would be acceptable to the Trobrianders, for example, who are *never* able to perceive a resemblance between a child and its mother or, indeed, any maternal kinsmen? It seems debatable whether there are percepts which possess a "stable, uniform, and veridical character for all human organisms." Köhler's essay, "Remarks on Some Questions of Anthropology,"[1] discusses this very point and poses questions which need further study.

Closely related to this is the whole problem of meaning, especially linguistic meaning. The chapter on the "unsolved" problem of meaning deals with this in a manner which apparently takes for granted the traditional view that language symbols are mere conveyers of meaning. This may be true, but in the view of many linguists, especially the late Benjamin Whorf, it must at least be regarded as controversial. The Whorfian hypothesis that language plays a primary role in determining how the individual "sees" (perceives) his world and how he thinks about it, may not stand up, but at present it may not be ignored. Whorf, Sapir, and earlier specialists in this field have much to say that is of significance to the

[1] Köhler, W. *American Journal of Psychology* 50: 271-288; 1937.

perception theorists. There *is* the problem of pre-linguistic perceiving (or meaning) to which Professor Allport makes passing reference. The study of the kind of perceiving called "physiognomic" by Köhler and other vestaltists may throw some light here, especially since there is probably a close relation between it and the linguistic phenomena of metaphor. Relevant to all of this are the studies of the "expressive" use of language (Werner and co-workers), and especially Rudolph Arnheim's recent book, *Art and Visual Perception.*

The foregoing comments should be read as questions rather than adverse criticisms. We may credit Professor Allport with the fact that he has resolutely faced the problems in the most difficult field in psychology and written a definitive book about them.

KINDER, JAMES S. and McCLUSKY, F. DEAN. *The Audio-Visual Reader.* Dubuque, Iowa: Wm. C. Brown Company, 1954. 382 p.

Reviewed by

ALEXANDER H. HOWARD, JR.

Here is a collection of readings in audio-visual education that makes a unique contribution to the rapidly growing literature of the field by bringing together "fugitive" writings under one cover. It was designed with the idea of ending the frustrating experience of running down references on an audio-visual topic only to find that the sources containing them are not in the library. While this volume does not eliminate "frustration from fugitives" entirely, it does contribute to its reduction by presenting a good cross-section of currently valuable ideas about the field which have appeared in magazines, bulletins, reports, monographs, leaflets, and miscellaneous out-of-print, difficult-to-find sources.

The contents are highly selective, but comprehensive and balanced. McClusky's *The A-V Bibliography,* published in 1950, contains more than 3000 references. *The Audio-Visual Reader* contains only about 200 articles. Evidently an effort was made to temper editorial bias by including controversial writings so that it is possible for the reader to benefit from differing points of view. The assistance of 10 audio-visual leaders across the country was also enlisted in making selections, but the responsibility for the inclusion or rejection of all materials is accepted by the editors. They indicate that the selections were governed by the effort to answer the "why," "what," "when," "where," and "how" type of questions that stu-

Alexander H. Howard, Jr., is director of the Office of Visual Education, Central Washington College of Education, Ellensburg, Washington.

dents, teachers, administrators, and audio-visual specialists frequently ask.

Those readers who are impressed as much by *who* writes as by *what* is written should be satisfied. The editors themselves are recognized authorities in the field, and besides several articles of their own there are articles by other well known-authors in the field, including Dale, Hoban, Noel, Corey, Reed, Stenius, Allen, Hamilton, Trolinger, Cypher, Woelfel, Cochran, Finn, Cross, Witt, and Brown. According to a statement in the preface, the 136 authors and 6 committees involved represent classroom teachers at the elementary, secondary, and higher-education levels; administrators; supervisors; researchers; librarians; audio-visual specialists on the building, city, county, state, and institutional levels; business men; ministers; a museum specialist; editors; students; and a director of educational activities for a television station. Unfortunately for the reader concerned with the "who," the position or background of each author is not given; the reader, therefore, must judge the "slant" of each article from the exposition alone.

The book is organized into eight parts: (1) the philosophy and theory of audio-visual instruction, (2) audio-visual teaching materials and their use, (3) elementary schools, (4) secondary schools, (5) higher education, (6) administration of audio-visual instruction, (7) research, and (8) miscellaneous. Each part is in turn divided into subcategories to enable the reader to pinpoint material pertinent to a particular question. For example, the "miscellaneous" section takes on meaning when it is known that it includes, among others, articles dealing with adult education, military programs, public libraries, religious education, and rural schools. Similarly, the other parts of the volume are subdivided and labeled by fairly specific topic headings.

A reader of this magazine would probably be most interested in Part I, the philosophy and theory of audio-visual instruction. There is a section on philosophical and psychological background, another on historical background, and one on audio-visual materials and the curriculum. If you are responsible for training others in the field of audio-visual instruction you will undoubtedly find it refreshing to think through again some of the basic concepts presented, and may reformulate material for use in your classes. Dale's treatise, "The Why of Audio-Visual Materials," is just as stimulating now as it was when it first appeared in his newsletter back in 1947. And much intellectual pleasure can be derived from Reed's "Communicat What to Whom and Why?" or Norberg's " 'Visual' and 'Verbal' Paths to Learning." Kandel's "Aids or Substitutes?"

A fascinating article in Part I, Corey's "The Unique Contri-

bution of Audio-Visual Instructional Materials in the Curriculum," begins by stating that "it is ineffectual to urge teachers to use more audio-visual materials." In the first place, the author reasons, it confuses means and ends; in the second place, the urger is in the position of implying that he knows all about the curriculum; and in the third place, very few people change their ways as a result of exhortation. The alternative he proposes is the consultation approach in which the instructional-materials expert works "*with* teachers, not *on* teachers." Corey emphasizes that teachers and materials experts alike should be basically concerned with the improvement of instruction, and that this requires consideration of our basic questions: What should boys and girls learn? How can we motivate them to want to learn what they should? What should the boys and girls *do* in order to learn what we are trying to teach them? How can we find out whether or not our instruction has been successful? He spells out the relation of audio-visual materials to these problems with examples, the best of which is his quotation of "The Poor Scholar's Soliloquy" to point up the importance of motivation. He concludes that "every single thing the teacher does in the classroom is influenced by her concept of instructional materials."

In-service teachers and teacher trainees will be particularly interested in the section on audio-visual teaching materials and their use. There are articles on the various types of projected materials such as motion pictures, filmstrips, slides, and opaque projectibles. Nonprojected materials such as maps and globes, charts, flat pictures, recordings, stereographs, objects, specimens, models, and illustrations in books get some attention too. Display devices, including the chalkboard, bulletin board, feltboard, diorama, and exhibit are also dealt with, as are the activities known as the "field trip" and the "dramatization." While this array of articles is impressive, the reader will not find them entirely comprehensive. Many answers to the "what," "why," "where," and "when" questions are just not there, or are not there *conveniently*. For instance, someone interested in the "demonstration" will have to do considerable digging to get information, even with the help of the index.

Nevertheless, the reader will find a wealth of ideas in this section, both "something new" and "something old treated in a new way." An example of the latter is Sprenger's "The Chalkboard—A Neglected Giant of Visual Education." Another is Moore's "Let's Improve Our Bulletin Board." One that provokes thought both by its message and its manner is Vagt's "Ay, There's the Rub," which points out that inability to preview a film before using it is no excuse for using it improperly; that with little effort a teacher could consult others who have used the film, check the film guide, or read

a film review in order to be prepared to *teach* with the film rather than merely *show* it. There are many other specific articles full of specific ideas about specific problems.

A couple of dozen articles are aimed at elementary-school people. Notable among these is a general discussion by Cypher entitled "Why Think About Audio-Visual Materials?" which implies if it does not state that teachers too often get in a kind of robot rut in the use of materials; that they should constantly keep aware of what they are doing with them. Other selections deal with the use of audio-visual materials in the various subject areas of the curriculum, including arithmetic, art, health, music, reading and the language arts, science, and the social studies. One entitled "Slides and Films Are Not Supplementary Materials" supports the notion that these materials are *fundamental teaching tools* in science—not *supplementary* materials.

Many "how" questions are answered in Part IV which treats secondary schools. The reader finds such articles as "Practical Application of A-V Aids in Your Physical Education Class," "Saving Radio Programs with Our Tape Recorder," "Short Cuts in High School English with the Opaque Projector," and "Teenagers on Television." Highpoints of this section, however, are the articles, "The Importance of Perceptual Learning," by Corey, and "Learning by Listening," by Dale.

Part V, Higher Education, also contains several interesting articles. One by Hocking, called "The Power of Babel," describes a foreign-language laboratory equipped with tape recorder, microphones, and earphones making possible simultaneous oral-auditory drills in six different courses or languages. Woelfel's "Teaching Aids Laboratory," describing the setup at Ohio State, is significant because many institutions are now considering the establishment of such centers on their campuses. The editors showed excellent judgment by including Dale's address, "The Role of Audio-Visual Materials in General Education." His discussion of the meaning of *generality* and *specificity* is first rate, and he shows how audio-visual materials can contribute the specifics needed to make generalizing easier and more meaningful. He has said this before, but never more interestingly.

As might be expected, the section on administration includes articles on architectural plans, budget and finance, distribution of materials, production, public relations, personnel, selection of materials, maintenance, in-service training, and other basic problem areas that administrators face. For example, there is a good article, "Audio-Visual Building Coordinator," by Harcleroad and Hite. It delineates the coordinator's areas of responsibility, his need to be

"Johnny on the spot," how he can get others to share the task, and the approach he should use with the staff. "The Why of Classroom Planning" is another good example, as is Crombie's "Film Selection and Evaluation." It is interesting to note that Cochran's "Inaugurating an Audio-Visual Program" makes points just as pertinent today as they were eight years ago when first published.

Although the space alloted to Part VII, Research, is somewhat limited, the material is especially valuable at the present time when more and more audio-visual specialists are realizing the need for more research in the field. Kinder is certainly justified in selecting some of his own writing for inclusion in this section. His "Research on Value and Utilization of Audio-Visual Materials in Education and Related Fields" does a good job of giving an over-all picture of research in audio-visual education. Obviously he could not spell out specific research findings because of space limitations. To show the nature of some of the research summarizations, the editors included three recent articles. Allen's "Research Verifies the Value of Audio-Visual Materials" points up some of the more common questions raised in connection with audio-visual utilization. Wittich, in "Needed Research in Audio-Visual Methods" points to some of the problems and opportunities in the field in specific terms. Probably the first comprehensive review of educational television research to be published, Finn's "Television and Education: A Review of Research," has already been subjected to critical review in a 1953 issue of this magazine.

Without question, McClusky had good reason to choose an article of his own for the last in the volume. He has been in the field a long, long time, and has "audioed a lot of visual." His "Audio-Video Distrust of Verbalism Gives New Impetus to A-V Education" indicates trends and problems in the field and suggests what might be done about them.

This book is a valuable contribution to the literature of the field. The editors have done a good job of preparing a collection of "fugitive" articles which, while necessarily selective, provides the reader with a comprehensive and representative sampling of ideas pertinent to all the basic areas of the field. Although the book lacks the continuity and organization needed to make it useful as a basic text, it would make an excellent "second" book for an audio-visual course.

As a book apparently designed to champion use of audio-visual techniques in communication it makes little use of visual materials to aid the reader's comprehension. The few illustrations it has are purely decorative—the ideas worth getting are in verbalized form. But then, is not a Reader supposed to be *read?*

RESEARCH ABSTRACTS

COMPARATIVE EFFECTIVENESS OF TRAINING AIDS

TORKELSON, G. M. "The Comparative Effectiveness of a Mockup, Cutaway, and Projected Charts in Teaching Nomenclature and Function of the 40mm Antiaircraft Weapon and the Mark 13 Type Torpedo." *Technical Report SDC 269-7-100. Research by the instructional Film Research Program, Pennsylvania State University for the Special Devices Center, Office of Naval Research, Port Washington, L. I., N.Y. 21 pages. March 16, 1954.*

Purpose: Little research has been conducted on the difficult problem of selecting the right type of training aid for a specific training problem. The comparative training effectiveness of mockups, charts or transparencies and cutaways is one of the most important factors in planning for a training device. The purpose of this study was to compare the effectiveness of training with cutaways, mockups, and transparencies for instruction on the Mark 13 Type Torpedo and the 40mm Antiaircraft Gun.

Procedure: A cutaway supplemented with selected illustrations in a training manual was compared with manual illustrations alone and with a series of black and white and colored transparencies in teaching about the Mark 13 Type Torpedo. A mockup of the 40mm antiaircraft weapon, supplemented with selected illustrations from a training manual was compared with the manual illustrations alone, and with a series of black and white and colored transparencies. The training was done under normal instructional conditions to reduce undesirable research effects. Each aid was used with the standard lecture which remained constant. Standardized tests and specially constructed objective tests were used as measures of learning.

Results: There were no differences in training effectiveness between cutaways, mockups, transparencies, and manual illustrations when used with the regular lecture. Slight differences in favor of the three dimensional devices were demonstrated for retention of information; however, the slight difference was not thought to be sufficient to justify their increased cost and increased time for use in training. Tentative conclusions were drawn concerning trainee understanding concepts of motion, learning nomenclature, the value of using diagramatic versus verbal questions; and economy of time and money in use of the aids. It was recommended that mockups and cutaways should be justified on grounds other than training effectiveness and that transparencies

should accompany the more expensive mockups and cutaways to encourage the use of the most economical aid that will fulfill the training requirement.—*L. Twyford.*

SWANSON, ROBERT A. "The Relative Effectiveness of Training Aids Designed for Use in Mobile Training Detachments." *Research Review, AFPTRC-TR-54-1 Air Force Personnel and Training Research Center, Lackland Air Force Base, Texas. 14 pages. 1954.*

Purpose: Operating mockups, nonoperating mockups, cutaway mockups, animated panels, charts and symbolic diagrams can be used to provide transitional training to Air Force maintenance personnel. There are large differences in their cost and ease of production and utilization. The purpose of this study was to measure the relative effectiveness of six representative types of training devices when these devices are used in conjunction with a lecture presentation.

Procedure: Skilled mechanics were given instruction on the maintenance of the hydraulic, fuel, and rudder power control systems of the B-47 aircraft. The six different types of training aids were used to explain each system. The same lecture presentation was used with each training aid. Tests were given before and after the instruction to measure the effectiveness of the various aids.

Results: There were no appreciable differences in training effectiveness of the various training aids employed. There was no evidence that certain training aids were more effective with lower proficiency men or with higher proficiency men. On six to eight weeks delayed recall differences in training effectiveness between training devices were negligible. These results suggest that for satisfying training objectives using methods similar to those employed in this experiment some of the complex and expensive training aids may not be any more effective than less complex and less expensive devices.—*L. Twyford.*

MURIN, J. A.; VANDERMEER, A. W.; and VRIS, T. "Comparison of Training Media: Trainee Manipulation and Observation of Functioning Electrical Systems Versus Trainee Drawing of Schematic Electrical Systems." *Technical Report SDC269-7-101. Research by the Instructional Film Research Program, Pennsylvania State University for the Special Devices Center, Office of Naval Research, Port Washington, L. I,. N.Y. 30 pages. June 23, 1954.*

Purpose: This study tested the assumption that training aids that permit the student to observe actual manifestations of principles being taught lead to more effective understanding of the principles. This "breadboard" type of device includes electrical, hydraulic, or mechanical setups which function in such a manner that the learner is able to observe what occurs as a result of his manipulations and calculations. In this research the training effectiveness of a wiring board on which a trainee manipulated components was compared with a diagram on which circuits were drawn by the trainee for the purpose of learning basic electricity; i. e., circuit theory, circuit problems, and the use of electrical meters.

Procedure: Using a wiring board, Naval personnel connected power supplies, lights, buzzers and electrical meters together and compared their actual

meter readings with those obtained by calculations. A comparable group learned by a diagram method in which trainees merely drew line drawings of the circuits and were given the data by the instructor. These two groups at a Naval base were compared with those who received their regular instruction in basic electricity.

Results: Learning how to solve electrical problems was not improved by use of either training device. The diagram and the wiring board improved learning how to use meters to an equal extent. Learning of theory by the lower GCT group was slightly improved by use of the diagram but not by the wiring board. Learning of basic principles of electricity, as measured by the entire test battery, was not improved by either device. It was concluded that manifestations of electrical phenomena are not necessary to learn Ohm's law. This study gives further validity to previous studies that have shown no great differences in the training effectiveness of charts and operable mockups.—*L. Twyford.*

DENENBERG, VICTOR H. "The Training Effectiveness of a Tank Hull Trainer." *Technical Report No. 3, Human Resources Research Office, The George Washington University, Washington 7, D. C. 28 pages. February 1954.*

Purpose: The purpose of this study was to determine the effectiveness of a tank hull trainer and an inexpensive mockup of the instrument panel and driver's controls of the M47 tank for teaching starting and stopping procedures and driver's instruments and controls. The trainer was also studied for its effectiveness in teaching about the track and suspension system.

Procedure: Under the regular procedure each trainee actually practices starting and stopping the M47 tank. The two experimental groups received instead instruction on the hull trainer and the mockup. Training effectiveness was measured by a performance test of starting and stopping the M47 tank, plus a paper and pencil test to measure knowledge of names and locations of control panel instruments. A 15 item test was used to measure learning about the track and suspension system. One instructor taught both experimental and control groups. Groups were equated for intelligence.

Results: For teaching starting and stopping procedures the inexpensive mockup was found to be a better training aid than the tank hull trainer. Actual participation was not found to be required. For teaching nomenclature and location of various driver's instruments and controls, the mockup, the hull trainer, and the tank itself were found to be equally effective when used in training. In terms of cost it was concluded that the mockup is a better training aid than the hull trainer for teaching this lesson. For teaching information on the track and suspension system the tank hull trainer was better than the tank itself.—*L. Twyford*

OTHER PUBLICATIONS

Department of Audio-Visual Instruction
National Education Association of the United States
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Price, $0.50

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